U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-257 330

Evaluation of Waste Sources in the Memphis, Tennessee Area

National Field Investigations Center-Denver, Colo

Prepared for

Environmental Protection Agency, Atlanta, Ga Region IV

Aug 72

BIBLIOGRAPHIC DATA SHEET

1. Report No. EPA/330/2-72/011

2.

3. Recipient's Accession No. PB-257 330

4. Title and Subtitle
Evaluation of Waste Sources in the Memphis, Tennessee Area

5. Report Date Aug 72

6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
National Field Investigations Center-Denver, Colo.

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address
Environmental Protection Agency, Atlanta, Ga.

13. Type of Report & Period Covered

14.

15. Supplementary Notes
Prepared in cooperation with Environmental Protection Agency, Atlanta, Ga. Region IV.

16. Abstracts

In southwestern Tennessee the Mississippi River is a navigable, interstate stream. Three of its tributaries, Nonconnah Creek and the Loosahatchie and Wolf Rivers, are degraded by industrial and domestic wastewater as they flow through the metropolitan area of Memphis, Tennessee. A survey was conducted in February 1972, and the results given.

17. Key Words and Document Analysis. 17a. Descriptors

*Water pollution,
*Nonconnak Creek,
*Loosahatchie River,
*Wolf River,
Industrial wastes,
Sewage,
Sources,
Urban areas,
Water pollution abatement,
Industries,
Mississippi River.

17b. Identifiers/Open-Ended Terms

*Water quality datam
Memphis (Tennessee)

17c. COSATI Field/Group 13 B

18. Availability Statement
National Technical Information Service
Springfield, Virginia 22161

19. Security Class (This Report) UNCLASSIFIED

20. Security Class (This Page) UNCLASSIFIED

21. No. of Pages 221p.

22. Price 7.75/2.25

FORM NTIS-35 (REV. 3-72)

THIS FORM MAY BE REPRODUCED

USCOMM-DC 14952-P72

ENVIRONMENT

OFFICE

260006

PB 257 330

EVALUATION

MEM

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

EPA-330/2-72-011

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT

REPORT ON

EVALUATION OF WASTE SOURCES IN THE MEMPHIS, TENNESSEE AREA

NATIONAL FIELD INVESTIGAIONS CENTER-DENVER
DENVER, COLORADO
and
REGION IV, ATLANTA, GEORGIA

AUGUST 1972

TABLE OF CONTENTS

Page

GLOSSARY OF TERMS vii

INTRODUCTION 1

DESCRIPTION OF AREA 5

PLANNED WASTE TREATMENT IN THE CITY OF MEMPHIS 7

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS 8

THE BUCKEYE CELLULOSE CORPORATION 17

CHAPMAN CHEMICAL COMPANY 24

DAY & NIGHT COMPANY
PAYNE COMPANY, COLLIERVILLE, TENNESSEE 30

DELTA REFINING COMPANY 35

E. I. DUPONT DE NEMOURS & COMPANY (INC.) 43

THE FIRESTONE TIRE & RUBBER COMPANY 50

W. R. GRACE & COMPANY, AGRICULTURAL CHEMICALS GROUP 59

HUMKO PRODUCTS CHEMICAL DIVISION (POPE STREET) 67

HUMKO PRODUCTS CHEMICAL DIVISION (THOMAS STREET) 73

HUNT-WESSON FOODS 81

ICI AMERICA INC. (FORMERLY ATLAS CHEMICAL) 88

INTERNATIONAL HARVESTER COMPANY,
FARM EQUIPMENT DIVISION 93

KIMBERLY-CLARK CORPORATION, MEMPHIS MILL 99

NAVAL AIR STATION MEMPHIS (84),
MILLINGTON, TENNESSEE 107

CITY OF MILLINGTON MUNICIPAL TREATMENT SYSTEM 111

THE QUAKER OATS COMPANY 116

TABLE OF CONTENTS (CONT.)

Page

JOS. SCHLITZ BREWING COMPANY 124

SMALLEY MAGNESIUM COMPANY, INC.
DIVISION OF PIPER INDUSTRIES, INC.
COLLIERVILLE, TENNESSEE 130

VALLEY PRODUCTS COMPANY 138

APPENDICES

A APPLICABLE WATER QUALITY REGULATIONS

B CITY OF MEMPHIS ORDINANCE NO. 460

C EPA SURVEY CORRESPONDENCE

LIST OF FIGURES

Figure No.	Title	Follows Page
1	Memphis, Tennessee, Vicinity Map	1
B-1	The Buckeye Cellulose Corp. Sampling Stations B-19-A, B-19-B	18
C-1	Chapman Chemical Company & Valley Products, Memphis, Tennessee Sampling Stations C-22-A, C-22-B, VP-23	25
DN-1	Day and Night Manufacturing Company, Memphis, Tennessee Sampling Station DN-16	31
DR-1	Delta Refining Company, Memphis, Tennessee, Sampling Station DR-12	36
DP-1	E. I. duPont de Nemours and Company, Memphis, Tennessee Sampling Station D-9	44
F-1	The Firestone Tire and Rubber Company, Memphis, Tennessee Sampling Stations F-18-A, F-18-B	51
G-1	W. R. Grace and Company, Memphis Tennessee, Sampling Station G-10	61
HP-1	HumKo (Pope), Flow Diagram	68
HT-1	HumKo Products Thomas Street, Memphis, Tennessee, Sampling Stations HT-11-A, HT-11-B	74
HW-1	Hunt-Wesson Foods, Memphis, Tennessee, Sampling Station HW-13	81
ICI-1	ICI America, Inc., Memphis, Tennessee, Sampling Station AC-20	89
IH-1	International Harvester, Memphis Tennessee, Sampling Station IH-17	94
K-1	Kimberly-Clark Corp. Memphis, Tennessee, Sampling Station KC-14	101

LIST OF FIGURES (CONT.)

Figure No.	Title	Follows Page
M-1	Naval Air Station Memphis (84) Wastewater Treatment System Sampling Station M-7	108
CM-1	City of Millington Wastewater Treatment Plant, Millington, Tennessee, Sampling Station CM-8	112
Q-1	The Quaker Oats Company, Memphis Tennessee, Sampling Station QO-15	117
S-1	Jos. Schlitz Brewing Company, Memphis, Tennessee Sampling Station S-24	125
SM-1	Smalley Magnesium Company, Collierville, Tennessee Sampling Stations PB-25-A, PB-25-B	133
C-1	Chapman Chemical Company & Valley Products, Memphis, Tennessee Sampling Stations C-22-A, C-22-B, VP-23	139

LIST OF TABLES

Table No.	Title	Page
1	Waste Sources Surveyed, Memphis, Tennessee Area	3
2	Summary of Waste Loads	9
3	Summary of Pollution Sources and Refuse Act Status	14
B-1	Summary of Field Data and Analytical Results, The Buckeye Cellulose Corp.	20
CC-1	Summary of Field Data and Analytical Results, Chapman Chemical	28
DN-1	Summary of Field Data and Analytical Results, Day & Night Company	33
DR-1	Delta Refining Company, Discharge Analyses Reported to the Tennessee Water Quality Control Board	38
DR-2	Summary of Field Data and Analytical Results, Delta Refining Company	40
DP-1	Summary of Field Data and Analytical Results, E. I. duPont de Nemours & Company (Inc.)	46
F-1	Summary of Field Data and Analytical Results, Firestone Tire and Rubber Company	53
G-1	Summary of Field Data and Analytical Results, W. R. Grace & Company, Agricultural Chemicals Group	64
HP-1	Summary of Field Data and Analytical Results, HumKo Products Chemical Division (Pope Street)	70
HT-1	Summary of Field Data and Analytical Results, HumKo Products (Thomas Street)	76
HW-1	Summary of Field Data and Analytical Results, Hunt-Wesson Foods	85

LIST OF TABLES (CONT.)

Table No.	Title	Page
ICI-1	Summary of Field Data and Analytical Results, ICI America, Inc.	91
IH-1	Summary of Field Data and Analytical Results, International Harvester Company	96
K-1	Kimberly-Clark Corporation, Data Submitted to the Tennessee Water Quality Control Board	101
K-2	Summary of Field Data and Analytical Results, Kimberly-Clark Corporation	104
M-1	Summary of Field Data and Analytical Results, Naval Air Station Memphis (84)	109
CM-1	Summary of Field Data and Analytical Results, City of Millington Wastewater Treatment Plant	114
Q-1	Analyses of the Quaker Oats Discharge to the Wolf River, Submitted to the Tennessee Water Quality Control Board	118
Q-2	Summary of Field Data and Analytical Results, The Quaker Oats Company Discharge to Wolf Interceptor	121
S-1	Summary of Field Data and Analytical Results, Jos. Schlitz Brewing Company	127
SM-1	Summary of Field Data and Analytical Results, The Smalley Magnesium Company	135
VP-1	Summary of Field Data and Analytical Results, Valley Products Company	141

GLOSSARY OF TERMS

BOD - Biochemical Oxygen Demand (Five-day @ 20°C)

COD - Chemical Oxygen Demand

DO - Dissolved Oxygen

Kj-N - Kjeldahl Nitrogen as Nitrogen

NH_3-N - Ammonia as Nitrogen

NO_2-NO_3-N - Nitrite-Nitrate as Nitrogen

Org N - Organic Nitrogen

Total P - Total Phosphorus

TOC - Total Organic Carbon

cfs - flow rate given in cubic feet per second

gpm - flow rate given in gallons per minute

mgd - flow rate given in million gallons per day

mg/l - concentration given in milligrams per liter

μg/l - concentration given in micrograms per liter

μmhos/cm - unit of specific conductance (mho -- the inverse of the standard unit of electrical resistance, the ohm) measured over a 1-centimeter distance, conventionally made at 25°C.

INTRODUCTION

In southwestern Tennessee the Mississippi River is a navigable, interstate stream [Figure 1]. Three of its tributaries, Nonconnah Creek and the Loosahatchie and Wolf Rivers, are degraded by industrial and domestic wastewater as they flow through the metropolitan area of Memphis, Tennessee.

Region VI and Region IV offices of the Environmental Protection Agency (EPA) requested that the National Field Investigations Center-Denver (NFIC-D) undertake an evaluation of waste sources and water quality conditions in the Memphis metropolitan area. A survey was conducted in February 1972, with the following objectives:

1. To evaluate the wastewater discharges from major industries in the Memphis metropolitan area and to use this information in evaluating the U.S. Army Corps of Engineers Refuse Act permit applications;
2. To evaluate the water quality of the Mississippi River upstream and downstream from the wastewater discharges of the Nonconnah and Wolf Interceptors and to determine whether or not water quality standards are being violated;
3. To develop recommendations for appropriate action to abate water pollution.

Pollution of interstate streams is subject to abatement under provisions of the Federal Water Pollution Control Act of 1965 (FWPCA), as amended (33 U.S.C. 466 et. seq.). Water quality standards applicable to the Mississippi River and interstate tributaries in the metropolitan

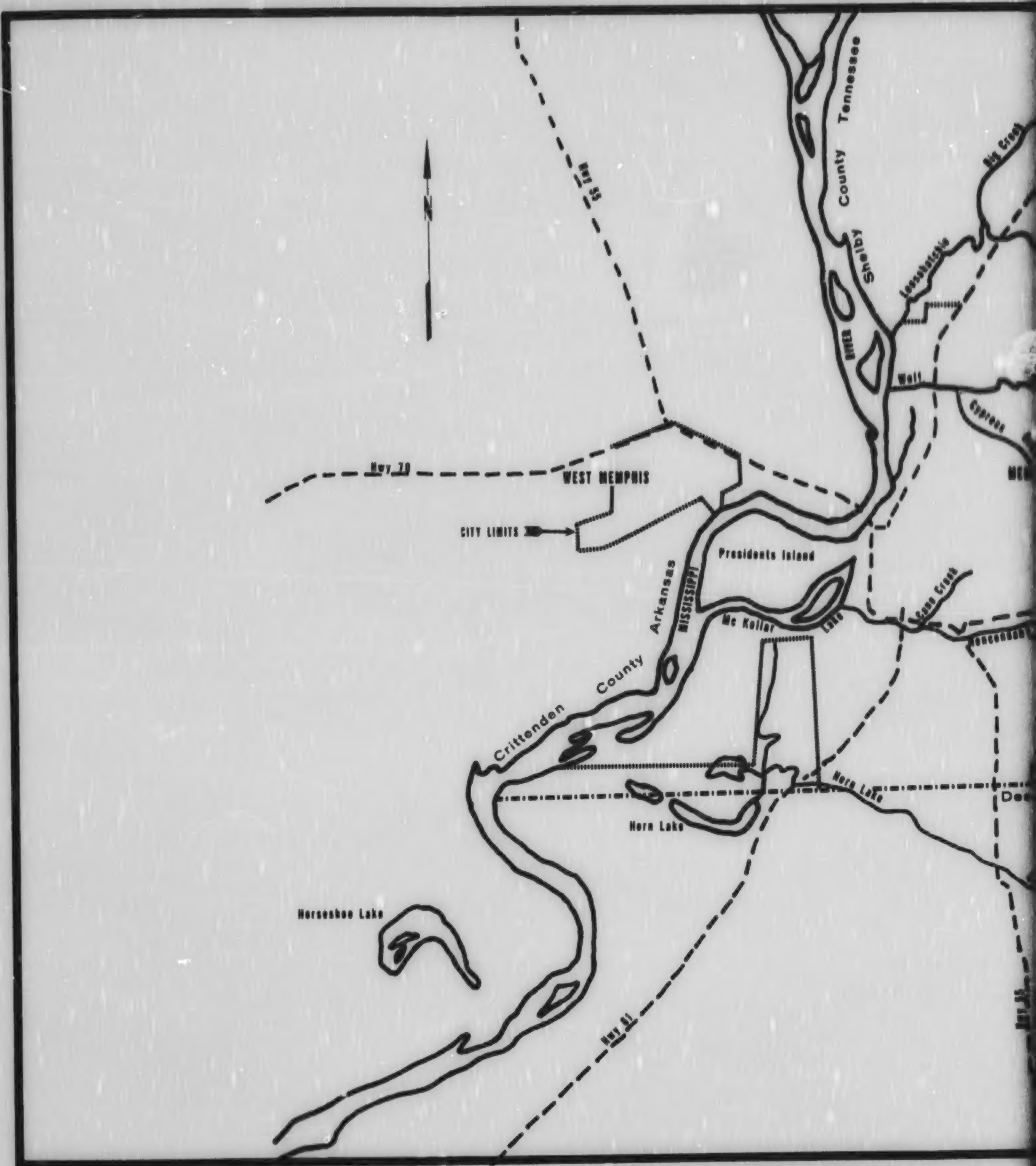
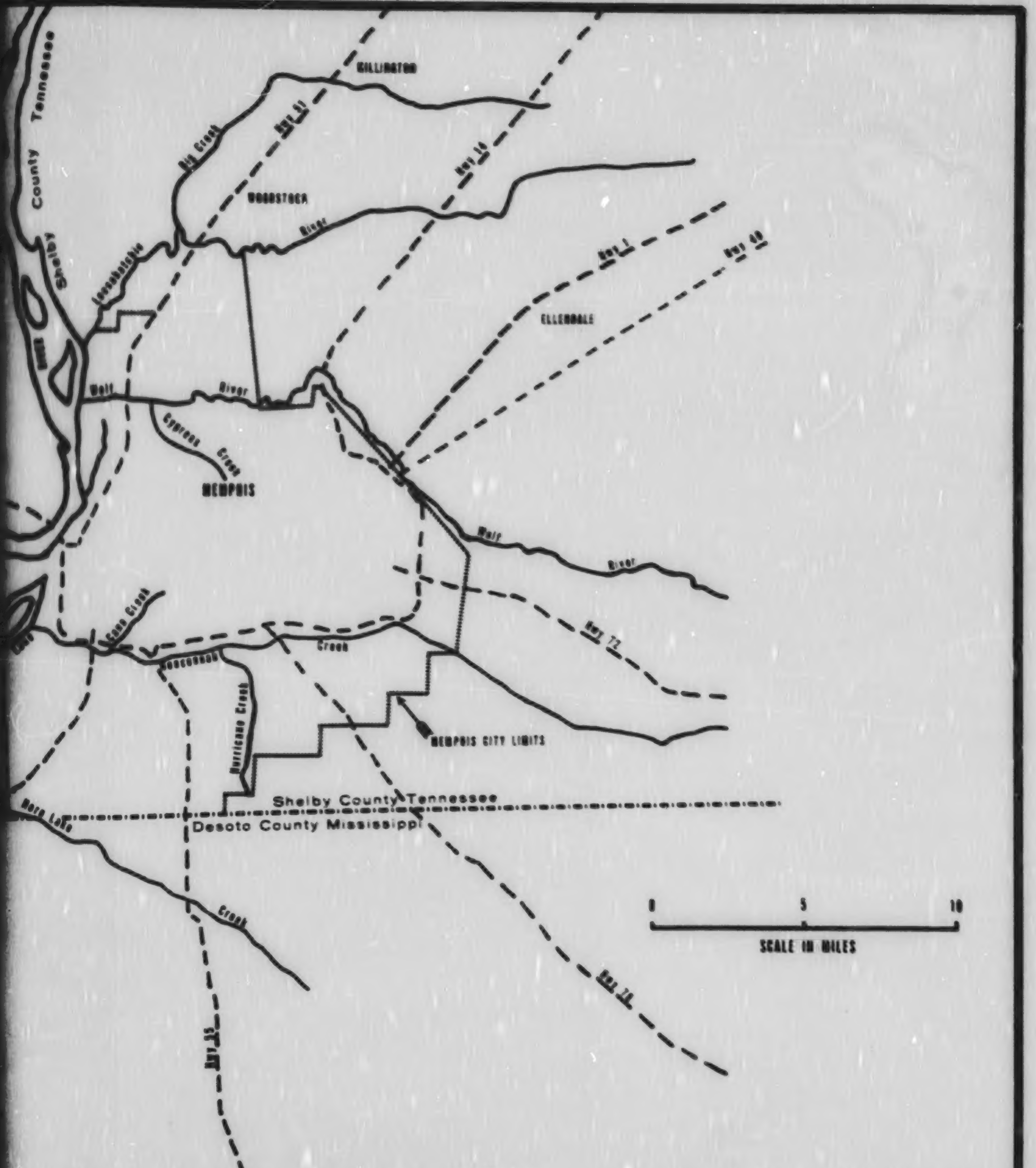


Figure 1 MEMPHIS, TENNESSEE Vicinity Map



NESSEE Vicinity Map

1-(a)

Memphis area have been established by the States of Arkansas, Mississippi, and Tennessee and approved as Federal standards pursuant to the provisions of the FWPCA [Appendix A]. The Rivers and Harbors Act of 1899 (33 U.S.C. 407) prohibits the discharge of industrial wastes (refuse) into navigable waters of the United States or into any tributary of a navigable water -- whereby refuse matter flows into such navigable water, without a permit from the U. S. Army Corps of Engineers [Appendix A].

Permits to discharge into surface streams are required by the State of Tennessee [Appendix A]. In addition, the City of Memphis has an ordinance, No. 460, on the Regulation of Sewer Use [Appendix B].

The waste source survey included determination of water supplies, types of raw materials, and process additives used by industries, kinds of products manufactured or synthesized, and sufficiency of wastewater treatment processes. Effluents of nineteen industries, one military installation, and one municipal wastewater treatment plant were evaluated. Prosecution of two industries, for 1899 Refuse Act violations, was recommended in two separate reports prepared earlier. This report recommends those measures necessary, including Refuse Act litigation, to abate pollution attributable to the remaining nineteen sources. [Industries and sampling locations included in this report are presented in Table 1.]

Included in this report is a section on each waste source that was evaluated. The format used for presenting information on each waste source is as follows:

A. Background Information -- includes general, historical, and contacts;

TABLE 1

WASTE SOURCES SURVEYED
MEMPHIS, TENNESSEE AREA

Sampling Location	Station Name
The Buckeye Cellulose Corporation	B-19
Chapman Chemical Company	C-22
Day & Night Company Payne Company, Collierville, Tennessee	DN-16
Delta Refining Company	DR-12
E. I. duPont deNemours & Company (Inc.)	D-9
The Firestone Tire & Rubber Company	F-18
W. R. Grace & Company, Agricultural Chemicals Group	G-10
HumKo Products Chemical Division (Pope Street)	HP-21
HumKo Products Chemical Division (Thomas Street)	HT-11
Hunt-Wesson Foods	HW-13
ICI America Inc. (formerly Atlas Chemical)	AC-20
International Harvester Company, Farm Equipment Division	IH-17
Kimberly-Clark Corporation, Memphis Mill	KC-14
Naval Air Station Memphis (84), Millington, Tennessee	M-7
City of Millington Municipal Treatment System	DCM-8
The Quaker Oats Company	QO-15
Jos. Schlitz Brewing Company	S-24
Smalley Magnesium Company, Inc. Division of Piper Industries, Inc., Collierville, Tennessee	PB-25
Valley Products Company	VP-23

B. Waste Sources and Treatment -- includes type of treatment system and diagram of sampling and discharge locations;

C. Discussion of In-Plant Evaluation and Results -- includes information on evaluation procedure, data from field and chemical analyses, waste loads and their effects on the receiving waters, and visual observations;

D. Summary and Conclusions; and

E. Recommendations

Correspondence associated with the implementation of the survey is found in Appendix C.

Assistance and support in the conduct of this investigation was provided by the following:

Enforcement Office, EPA, Region IV, Atlanta, Georgia;
Memphis and Shelby County Health Department; and
Tennessee Water Quality Control Board.

DESCRIPTION OF AREA

The Memphis metropolitan area, with a population of about 800,000, is a large industrial and agricultural center located on the Mississippi River in southwestern Tennessee. Almost all of this area is located in Shelby County, Tennessee -- with a small suburban area extending southward into DeSoto County, Mississippi. West Memphis, across the Mississippi River in Crittenden County, Arkansas, is also part of this metropolitan area [Figure 1]. Other suburban and nearby (Tennessee) communities include Woodstock, Millington, Ellendale, Arlington, and Collierville.

A number of diversified industries in the area are important to the economy of the tri-state region. Products manufactured include beer, vegetable oils, paper products, animal feeds, agricultural and industrial chemicals, pesticides, refinery products, farm machinery, heating and air conditioning equipment, automobile tires, and textile and wood products.

In contrast to the hilly, urbanized areas of the City of Memphis (situated on bluffs), the valleys of these tributaries (Loosahatchie and Wolf Rivers and Nonconnah Creek) are low-lying and subject to flooding, during high-flow stages, by backwater from the Mississippi. A levee system has been constructed along the tributaries and along the Mississippi River to alleviate flooding. An extensive storm drainage system has been constructed, with pumping stations to lift storm drain flow over the levees into the streams during high water stages. Many of the industries are located along the streams in areas protected by this levee system.

Wolf River and Nonconnah Creek are interstate streams with headwaters in the State of Mississippi. Having a drainage area of approximately 770 squares miles, the Wolf River is the largest tributary to the Mississippi River in this area. Stagnation occurs in the lower reach of the Wolf River during high stages on the Mississippi. Cypress Creek and Leath and Workhouse Bayous are small tributaries to the Wolf River draining urban and industrial areas.

The Loosahatchie River has a drainage area of several hundred square miles. Big Creek, with a drainage area of about 137 square miles, is the main tributary of the Loosahatchie.

Nonconnah Creek is a small stream with low flow. In its lower reach, much of the flow consists of industrial wastes, sanitary sewer overflows, and urban runoff. Nonconnah Creek discharges into McKellar Lake, a slack-water arm of the Mississippi River. The lake is located in an old channel of the river and is connected to the river by Tennessee Chute. Backwater conditions created by high stages in the Mississippi frequently produce stagnation in the lake. Cane Creek is a small tributary to Nonconnah Creek draining an industrial area.

At Memphis the average flow of the Mississippi River is approximately 460,000 cubic feet per second (cfs). Extremes in the flow range from 79,200 to more than one million cfs. (The low flow of record occurred prior to the construction of the various large upstream reservoirs that now provide flow regulation. Such a low flow is not expected to occur again.) High flows usually occur in the winter and spring months, with lowest flows coming in the late summer.

PLANNED WASTE TREATMENT IN THE CITY OF MEMPHIS

Presently the City of Memphis has no municipal waste treatment system. Municipal and industrial wastes collected by the Nonconnah and Wolf Interceptors are discharged, untreated, directly into the Mississippi River.

Two large secondary treatment plants (North and South) are planned to treat the wastewater collected by the Memphis regional wastewater interceptor system. The South plant, with a design capacity of 85 mgd, is under construction and is scheduled for completion in July, 1974. Construction of the North plant, with a design capacity of 135 mgd, is scheduled to begin about January 1973, with completion in December 1976. Delays in this schedule are evident in that lead elements such as plans and specifications are not completed as of September 1972. A large-scale regional interceptor system is now under construction in order to serve these planned waste treatment plants. As interceptors are completed, most industries are connecting to the system for disposal of industrial wastes. All wastes collected by the Memphis Interceptor System are discharged untreated into the Mississippi River. Few industries provide any pretreatment of their wastes prior to discharge to the interceptor system.

In 1970, about 90 mgd of mixed municipal and industrial wastes were discharged into the Mississippi River from six large Memphis interceptor outfalls. The Wolf Interceptor, to be served by the North plant, and the Nonconnah Interceptor, to be served by the South plant, are the two major receivers of industrial wastes. An additional 43 mgd of industrial wastes were discharged to tributary streams in the Memphis metropolitan area.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Conclusions regarding each of the nineteen sources evaluated are presented in the individual report sections. [A summary of the loads contributed by the sources is presented in Table 2.] These conclusions are summarized, as follows:

1. Industries that discharge inadequately treated or untreated wastewaters into the Mississippi River, a navigable stream, either directly or through the Wolf or Nonconnah Interceptors, include the following:

The Buckeye Cellulose Corporation
The Firestone Tire & Rubber Company
HumKo Products Chemical Division (Thomas Street)
International Harvester Company
The Quaker Oats Company
Jos. Schlitz Brewing Company
Valley Products Company

Average combined daily loads (in pounds) discharged by these firms include:

139,000	BOD	116	Chromium
348,000	COD	17	Lead
129,000	TOC	20	Phenolic Materials
107,000	Suspended Solids	15	Copper
51,000	Oil & Grease	55	Zinc

2. Industries that discharge inadequately treated or untreated wastewaters into the Wolf River, a tributary to a navigable stream, are:

The Firestone Tire & Rubber Company
HumKo Products Chemical Division (Pope Street)
(Thomas Street)
ICI America, Inc. (formerly Atlas Chemical Company)
Kimberly-Clark Corporation
The Quaker Oats Company
Smalley Magnesium Company

TABLE 2

SUMMARY OF WASTE LOADS

Company	BOD[a/]	Suspended Solids	Oil & Grease	Total Chromium	Zinc	Cyanide
Buckeye Cellulose Corp.						
Process Water	28,700	34,500	2,500		9.2	
Cooling Water		150			0.47	
Day & Night Mfg.	193	866	24		2.3	2.6
Delta Refining	556	184	72	1.07	.43	
E. I. duPont		7,000	1,000	2.7	3.2	14
Firestone Tire & Rubber						
Process Water	3,280	5,860	1,100		15.9	
Cooling Water		6,020			6.2	
W. R. Grace	122	557	210	23.8	9.1	0.7
HumKo Products (Pope St.)	11,400	3,980	3,700		1.6	
HumKo Products (Thomas St.)						
Pretreated	65,700	43,500	47,000	100	24.1	
Untreated	90,800	53,400	62,000	18.5	15.2	
Hunt-Wesson Foods	1,000	2,020	400		0.77	
ICI America	226	34	80			
International Harvester	425	2,830		15.9	1.6	

TABLE 2 (continued)

SUMMARY OF WASTE LOADS

Company	BOD[a]	Suspended Solids	Oil & Grease	Total Chromium	Zinc	Cyanide
Kimberly-Clark	4,780	12,700	1,800	14.3		
Naval Air Station Memphis	330	1,050	390	0.4	1.47	
City of Millington	363	454	120	0.1	0.48	
Quaker Oats	29,000	17,000	290	0.2	3.9	
Jos. Schlitz Brewing	10,100	3,460	140			
Smalley Magnesium Co.						
Rinse Water	770	74	5	0.08	1.03	
Chromium Treatment Pond				16.8		
Valley Products	1,750	289	200		0.17	

---

[a] Loads are in lb/day for all parameters.

The average combined daily loadings (in pounds) discharged by these firms include:

108,000	BOD	61	Phenolic Materials
63,000	TOC	35	Chromium
161,000	COD	38	Zinc
76,000	Suspended Solids	16	Lead
63,000	Oil & Grease*		

3. Two industries, W. R. Grace and Company and E. I. duPont de Nemours and Company, discharge inadequately treated wastewaters to the Loosahatchie River, a tributary of a navigable stream. The average combined daily loading (in pounds) discharged by the two firms are:

120	BOD	1,280	Organic Nitrogen
1,930	TOC	1,990	Ammonia
3,390	COD	15	Cyanide
7,600	Suspended Solids	12	Zinc
1,200	Oil & Grease	27	Chromium
		5	Lead

Ammonia, cyanide, zinc, and other metals in the DuPont discharge are toxic to the fish and aquatic life of the river, and contribute to violations of the water quality criteria.**

4. Hunt-Wesson Foods and Delta Refining Company discharge inadequately treated wastewaters into Nonconnah Creek, a stream that flows into McKellar Lake (a Mississippi River backwater). Chapman Chemical Company discharges into the creek, through ditches on Company property, but contributes less than 30 lb/day of TOC and COD. However, the Chapman effluent contains substantial quantities of Ramrod and Atrazine as well as other toxic organic chemicals (the 350 µg/l average concentration of Ramrod constituting a violation of the effluent level of 350 µg/l set by the Memphis

---

* Excludes load from The Firestone Tire and Rubber Company discharge F-18-B.

**General Water Quality Criteria for the Definition and Control of Pollution in the Waters of Tennessee.

and Shelby County Health Department). The average daily loadings (in pounds) in the discharges are as follows:

1,550	BOD	470	Oil & Grease
6,220	TOC	93	Phenolic Materials
3,490	COD	0.53	Ramrod
		0.20	Atrazine

Nonconnah Creek is classified as suitable for fish and aquatic life.* The waste loads discharged by these industries are detrimental to the uses for which the stream is classified.

5. Industries which now discharge or plan to discharge liquid wastes to the Memphis wastewater collection system, and which do not meet pretreatment requirements of Memphis Ordinance No. 460 include the following:

The Buckeye Cellulose Corporation
The Firestone Tire & Rubber Company
HumKo Products Chemical Division (Thomas Street)
(Pope Street)
Hunt-Wesson Foods
ICI America, Inc.
Kimberly-Clark Company
The Quaker Oats Company
Jos. Schlitz Brewing Company
Smalley Magnesium Company
Valley Products Company

6. Construction of the South Plant is on schedule; however, the progress of the construction of the North Plant is considerably behind schedule. Those industries whose discharges will reach the South Plant must provide pretreatment consistent with City Ordinance No. 460 and capability of the South Plant to adequately treat the industrial wastes. Industries from which industrial wastes will be treated by the North Plant must provide best practicable treatment prior to discharge to the

---

* General Water Quality Criteria for the Definition and Control of Pollution in the Waters of Tennessee.

interceptor system in order to protect the receiving waters until the North Plant is completed four to six years hence.

7. The discharges of inadequately treated or untreated wastes, as enumerated above, to the Mississippi River and Wolf River, both navigable streams, and to Nonconnah Creek and the Loosahatchie River, both tributaries to a navigable stream, are violations of Section 407, Rivers and Harbors Act of 1899 (33 U.S.C.: 401-411). [The pollution control facilities and the Refuse Act permit status of each source evaluated are provided in Table 3.]

B. RECOMMENDATIONS

Specific recommendations for each source of pollution are presented in the individual report sections. These recommendations are summarized as follows:

1. Recommendations were made, in the case of each Refuse Act violation, that a satisfactorily documented commitment, including an implementation schedule, to the attainment of best practicable treatment or pretreatment in the case of discharges to the South Plant, be provided by the industry. In the absence of such commitment, prosecution for violation of the Refuse Act is recommended. The industries to which this recommendation applies are:

The Buckeye Cellulose Corporation
Delta Refining Company
E. I. duPont de Nemours Company (Inc.)
The Firestone Tire & Rubber Company
W. R. Grace & Company
HumKo Products Chemical Division (Pope Street)
(Thomas Street)
Hunt-Wesson Foods
ICI America Inc.

TABLE 3

SUMMARY OF POLLUTION SOURCES AND REFUSE ACT STATUS

Name of Waste Source	Present Treatment	Adequate	Violation of Refuse Act	Receiving Stream	Permit Application Filed
The Buckeye Cellulose Corporation	Stream B-19-A Process Waste Segregation only	No	Yes	Wolf Interceptor-North Treatment Plant	No
	Stream B-19-B Cooling Water None	No	No	Cypress Creek - Wolf River	Yes
Chapman Chemical Company	Limestone Bed neutralization C-22-A carbon filter C-22-B	No	No	Nonconnah Creek	Yes
Day & Night Company Payne Company	None	No	Yes	City of Collierville and Wolf River	No
Delta Refining Company	API separator, Air flotation, Two holding ponds	No	Yes	Nonconnah Creek	Yes
E. I. duPont de Nemours & Company (Inc.)	Segregation, neutralization, settling pond	No	Yes	Loosahatchie River	Yes
The Firestone Tire & Rubber Company	Stream F-18-A Process Waste None	No	Yes	Wolf Interceptor-North Treatment Plant	No
	Stream F-18-B Cooling Water None	No	Yes	Leath Bayou - Wolf River	Yes
W. R. Grace & Company Agricultural Chemicals Group	Neutralization and settling pond with oil skimmer	No	Yes	Loosahatchie River	Yes
HumKo Products Chemical Division (Pope Street)	pH Control, air flotation	No	Yes	Workhouse Bayou - Wolf River North Treatment Plant	Yes

TABLE 3 (Continued)

SUMMARY OF POLLUTION SOURCES
AND REFUSE ACT STATUS

Name of Waste Source	Present Treatment	Adequate	Violation of Refuse Act	Receiving Stream	Permit Application Filed
HumKo Products Chemical Division (Thomas Street)	Stream HT-11-A None	No	Yes	Cypress Creek - Wolf River	Yes
	Stream HT-11-B pH Control, air flotation	No	Yes	Wolf Interceptor-North Treatment Plant	No
Hunt-Wesson Foods	Grease Trap	No	Yes	Cane Creek - Nonconnah Creek-South Treatment Plant	Yes
ICI America, Inc. (formerly Atlas Chemical)	Grease trap	No	Yes	Workhouse Bayou - Wolf River North Treatment Plant	Yes
International Harvester Company Farm Equipment Division	Neutralization	No	Yes	Mississippi River	Yes
Kimberly-Clark Corporation Memphis Mill	In-Plant fiber filter	No	Yes	Wolf River	Yes
Naval Air Station Memphis (84)	Secondary biological system	Yes	No	Big Creek - Loosahatchie River	Yes
City of Millington Municipal Treatment System	Secondary biological system	No	No	Big Creek - Loosahatchie River	
The Quaker Oats Company	Cooling water - Settling pond	Yes	No	Wolf River	Yes
	Process water - None	No	Yes	Wolf Interceptor - North Treatment Plant	No
Jos. Schlitz Brewing Company	In-plant controls	No	Yes	Nonconnah Interceptor - South Treatment Plant	No
Smalley Magnesium Company, Inc. Division of Piper Industries, Inc.	Stream PB-25-A Chromium reduction, settling pond	No	Yes	Wolf River	No
	Stream PB-25-B Rinse Water Only None	No	Yes	Wolf River	
Valley Products	None	No	Yes	Nonconnah Interceptor - South Treatment Plant	No

International Harvester Company
Kimberly-Clark Company
The Quaker Oats Company
Jos. Schlitz Brewing Company
Smalley Magnesium Company
Valley Products Company

2. It is recommended that the discharge permits, to be issued by the U. S. Army Corps of Engineers to discharges in the Memphis area, limit discharges of those pollutants now causing violation of the Refuse Act of 1899 to concentrations consistent with the best practicable treatment and water quality standards for the Mississippi River.

3. A recommendation was made that EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of each wastewater discharge to ensure compliance with applicable criteria.

THE BUCKEYE CELLULOSE CORPORATION
2899 JACKSON AVENUE
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Buckeye Cellulose plant, located at 2899 Jackson Avenue, manufactures chemical intermediates for the plastics, viscose and paper-use industries. Basically, the Company treats the cellulose fibers through cleaning, dissolving, bleaching and finishing operations. Buckeye also manufactures laminar sections that are converted into laminated print-circuit boards used in the electronics industry. The major raw materials incoming to this plant include cotton linters, cotton seed, and occasionally, intermediate (thin) paperboard sheeting. Paperboard is readily dissolved in solution and this lignin-cellulose combination is used in the manufacture of "rag content" specialty papers. Other raw materials are sulfuric acid, caustic soda, chlorine, acetone, and acetic acid.

Chronology of Contacts

On October 6, 1971, E. J. Struzeski, Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D), and Hugh Teaford, Memphis and Shelby County Health Department, conducted a preliminary inspection of the Buckeye Cellulose plant. R. T. Turner, Plant Manager, and J. Page, Assistant Manager, were apprised of the purpose of the survey. Mr. Turner cooperated with the EPA and granted permission to sample the plant effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Turner [Appendix C], confirming the date of the investigation and requesting written permission to sample. This method was taken to advise Buckeye Cellulose that information provided, as well as data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 2, 1972, Mr. Turner, in reply to Mr. Harlow's letter, granted permission to sample [Appendix C].

At the time of the survey Mr. Turner indicated it was necessary for a Buckeye Cellulose employee to accompany NFIC-D personnel during the time they were in the plant to sample the effluent.

B. WASTE SOURCES AND TREATMENT

The major waste stream (B-19-A) [Figure B-1] originates in the processing area and has been in contact with most of the raw materials. This stream is dark in color and contains large amounts of organic materials. Process wastes are combined and discharged through a Parshall flume into the Wolf Interceptor. Waste treatment is not being provided.

An application for a permit to discharge has not been filed with the U. S. Army Corps of Engineers for this discharge. The second discharge (B-19-B) is a stream that contains cooling water and filter washwater. In the plant operation there are eight filters, and each is backwashed six to eight minutes, three times per day. This effluent is discharged without treatment to a ditch leading into Cypress Creek, thence to the Wolf River.

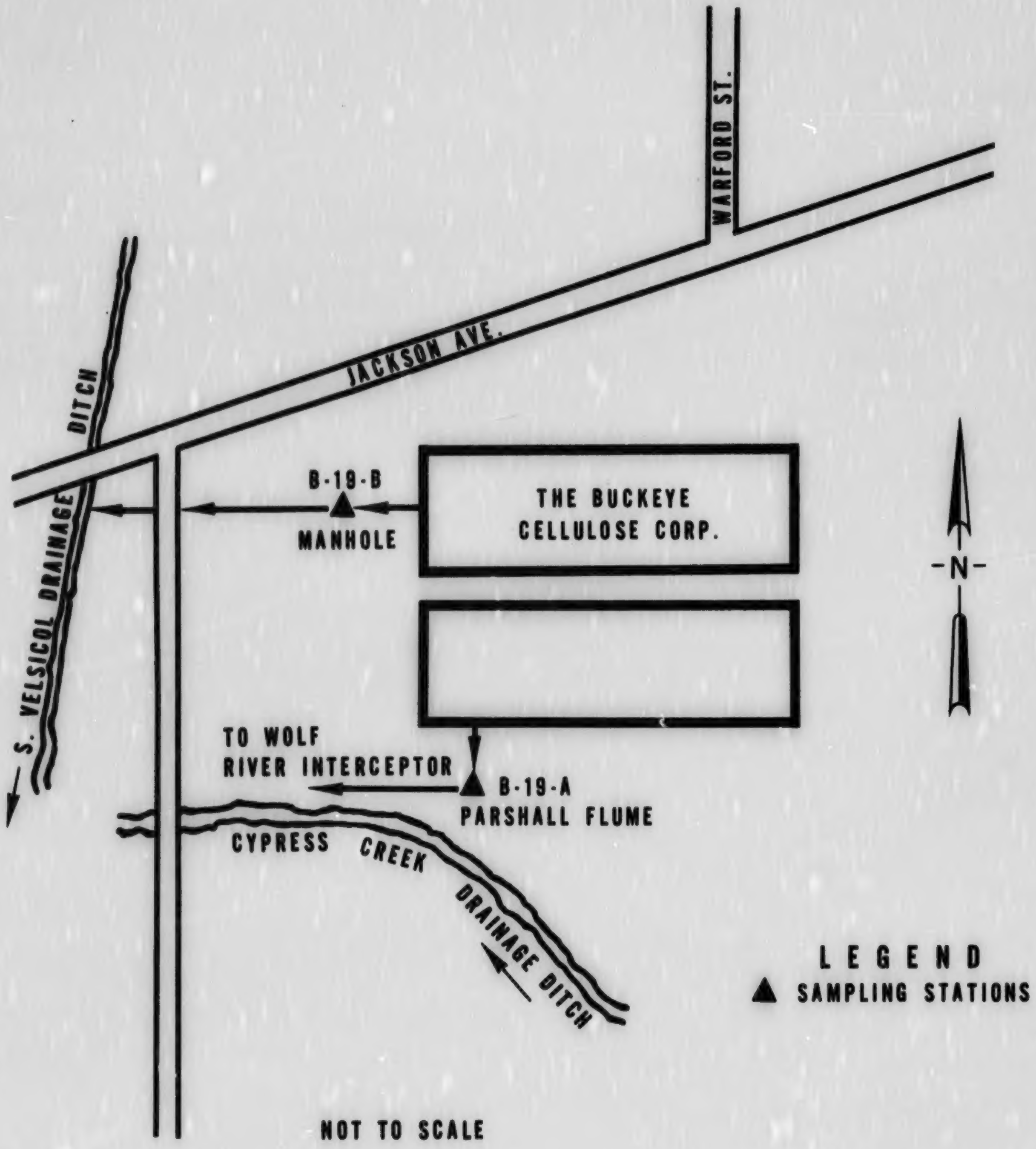

WARFORD ST.
JACKSON AVE.
S. VELSICOL DRAINAGE DITCH
B-19-B
MANHOLE
THE BUCKEYE CELLULOSE CORP.
N
TO WOLF RIVER INTERCEPTOR
B-19-A
PARSHALL FLUME
CYPRESS CREEK DRAINAGE DITCH
LEGEND
▲ SAMPLING STATIONS
NOT TO SCALE

Figure B–1 The Buckeye Cellulose Corp. Sampling Stations B-19-A, B-19-B

An application for a permit to discharge has been filed with the U.S. Army Corps of Engineers for the second discharge.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

A SERCO automatic sampler was used to collect samples of the process waste discharge (B-19-A) to the Wolf Interceptor [Figure B-1] on Company property at a point upstream of the Parshall flume. Beginning on February 22 and ending February 25, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted into the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory, located in Memphis; or shipped air freight-express to the NFIC-D laboratories (EPA). Whenever possible, split samples were provided to personnel of The Buckeye Cellulose Corporation. Grab samples were collected twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow readings were taken from Company flow meters.

Grab samples were taken from the cooling-water discharge (B-19-B) both during the filter backwash periods and during the time the discharges contained only cooling water. Flow from this discharge was measured by EPA personnel.

Discussion of Results

The process-water discharge (B-19-A) to the City interceptor ranged between 8.9 and 10.5 mgd [Table B-1]. The pH of the discharge ranged between 9.9 and 11.0. The high pH is in violation of Memphis Ordinance

TABLE B-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
THE BUCKEYE CELLULOSE CORPORATION
2399 JACKSON AVENUE
February 22-25, 1972

Parameter[a]	B-19-A Range	B-19-A Average	B-19-A Load lb/day	B-19-B Range	B-19-B Average	B-19-B Load lb/day
Flow, mgd	8.9-10.5				1.12	
pH	9.0-11.0			5.8-9.7		
Temperature, °C	28.5-34.5			22.5-31.0		
Conductivity, µmhos/cm	1,700-2,100			60-260		
BOD	320-400	360	28,700			
TOC	680-1,160	693	75,700	3-6	5	47
COD	1,610-1,780	1,700	136,000	22-32	25	233
Suspended Solids	380-450[b]	420	34,500	8-21	16	150
Total Solids	2,160-2,260[b]	2,210	183,000	129-310	218	2,030
Oil and Grease	23-49[c]	32	2,500			
Turbidity, JTU	20-220	88		55-200[b]	128	
Copper	0.03-0.04	0.04	2.9	0.02-0.06	0.03	0.28
Cadmium	<0.01[d]			<0.01-0.01	<0.01	
Zinc	0.10-0.14	0.12	9.2	0.03-0.09	0.05	0.47
Total Chromium	<0.01[d]			<0.01[d]		
Lead	<0.03[d]-0.03	<0.03		<0.03[d]-0.09	<0.07	

---

[a] All units are in mg/1 except as noted.

[b] Range of two values.

[c] Samples were analyzed after maximum preservation time had expired.

[d] Minimum detectable limit.

No. 460 which prohibits the discharge of wastewater having a pH greater than 9.5.

The wastewater contained an average of 28,700 pounds of BOD; 75,700 pounds, TOC; 136,000 pounds, COD; and 2,500 pounds of oil and grease. This discharge is contributing to the degradation of the receiving waters of the Mississippi River downstream from Wolf Interceptor.

The reach of the Mississippi River that receives this discharge from the Wolf Interceptor is classified by the Tennessee Water Quality Control Board for industrial uses, fish and aquatic life, irrigation, livestock watering, wildlife, and navigation. Under the criteria established by the State, there shall be no substances added to the waters that will produce toxic conditions.

The second discharge (B-19-B) had a variable flow because of intermittent filter backwash; however, the effluent averaged approximately 1.12 mgd and had a pH range of 5.8 to 9.7. The chemical and organic contents were not large; COD and TOC levels averaged 25 and 5 mg/l, respectively. Although the solids concentration was low, the turbidity averaged 128 JTU. During the period of the survey this discharge did not exert a significant pollutional load on Cypress Creek.

D. SUMMARY AND CONCLUSIONS

1. The Buckeye Cellulose Corporation discharges an average daily loading of 28,700 pounds of BOD; 75,700 pounds, TOC; 136,000 pounds, COD; and 2,500 pounds of oil and grease into the Wolf Interceptor. The Wolf Interceptor discharges into the Mississippi River, a navigable stream.

2. There is no treatment by The Buckeye Cellulose Corporation of the wastewater entering the Wolf Interceptor. The pH fluctuation and the chemical and organic loading contribute to the violation of the Federally approved water quality criteria for the Mississippi River established by the Tennessee Water Quality Control Board.

3. Lack of a municipal waste treatment system results in raw wastewaters being discharged directly into the Mississippi River via the interceptor system.

4. The discharge of industrial wastes into the Mississippi River, through the Wolf Interceptor, without a permit from the U. S. Army Corps of Engineers, is a violation of Section 407, Rivers and Harbors Act of 1899 (33 USC: 401-413).

5. The high pH discharged by Buckeye Cellulose to the Wolf Interceptor violates the Memphis Ordinance No. 460.

6. The Buckeye Cellulose Corporation also discharges 47 pounds of TOC and 233 pounds of COD per day to Cypress Creek. An application for a permit for this discharge has been filed with the U. S. Army Corps of Engineers.

E. RECOMMENDATIONS

It is recommended that:

1. The Buckeye Cellulose Corporation adopt measures to recycle part of its wastewater or to reduce the large volume of water being discharged to the Wolf Interceptor.

2. The Buckeye Cellulose Corporation provide pollution control facilities for its discharge to the Wolf Interceptor to reduce biochemical oxygen demand, chemical oxygen demand, and suspended solids,

to levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	530
COD	100	1,750
Suspended Solids	30	530

The pH of the wastewater discharges shall not be less than 6.5 nor greater than 8.5.

3. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria herein outlined by December 30, 1974.

4. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of the wastewater discharged to ensure compliance with Recommendations Numbers 1 and 2.

5. Upon failure of The Buckeye Cellulose Corporation to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1, 2 and 3, appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

CHAPMAN CHEMICAL COMPANY
416 BROOKS ROAD
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

The Chapman Chemical Company is engaged in the blending, mixing, and repackaging of purchased herbicides and wood preservatives. In addition the Company repackages and ships inorganic acids. Production schedules at Chapman Chemical vary greatly and are dependent upon demand for herbicides and wood preservatives. During peak production the plant operates continuously; otherwise it operates only during the day shift. Approximately 100 people are employed.

The major chemicals handled at this plant are: pentachlorophenol; sodium salts; Ramrod; Promitone; Atrazine; Petrolatum; pigments; caustic soda; hydrochloric acid; aluminum chloride; Bromicil; Karmex; sodium trichloroacetate; and phenylmercuric lactate.

City water (0.13-0.17 mgd) is used for cooling, process, and clean-up waters.

Chronology of Contacts

On September 8, 1971, W. C. Smith, E. J. Struzeski, and J. Hesson, Environmental Protection Agency (EPA) National Field Investigations Center-Denver (NFIC-D), met with J. P. Alrutz, Chapman Chemical Manager, Engineering and Quality, to make arrangements for NFIC-D personnel to conduct a preliminary inspection of the plant outfalls. Mr. Alrutz was apprised of the purpose of the survey [Appendix C]. He cooperated with the EPA repreentatives and granted permission to sample the Chapman Chemical Company effluent.

On January 31, 1972, George Harlow, Chief, Enforcement Branch, EPA Region IV, wrote a letter [Appendix C] to Mr. Alrutz, Chapman Chemical Company, confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the Company that information provided, as well as data regarding discharges from the Chapman Chemical Company premises, may be used as evidence against the firm in abatement proceedings under applicable laws. On February 2, 1972, Mr. Alrutz responded verbally to Mr. Harlow's letter, granting permission to sample.

W. C. Smith and E. Mann, NFIC-D investigators, met with Dennis Beene, Chapman Chemical, on February 11, 1972, and made final plans to sample the two Chapman outfalls.

B. WASTE SOURCES & TREATMENT

The majority of the effluent (discharges 001 and 002) [Figure C-1] from Chapman Chemical is cooling water with no apparent contact with process material. These discharges are not subject to treatment.

The effluent from discharge 003 [Figure C-1] passes through pump seals and has a pH of approximately 5 as it exits from the pumps. This effluent is discharged across a limestone bed that neutralizes the acid before the wastewater enters the west drainage ditch. About once per month, this stream contains discharge from a vapor scrubber in the aluminum chloride manufacturing unit.

All three of these effluent streams (001, 002, 003) discharge into the west ditch on the Chapman property. This ditch, as it enters the

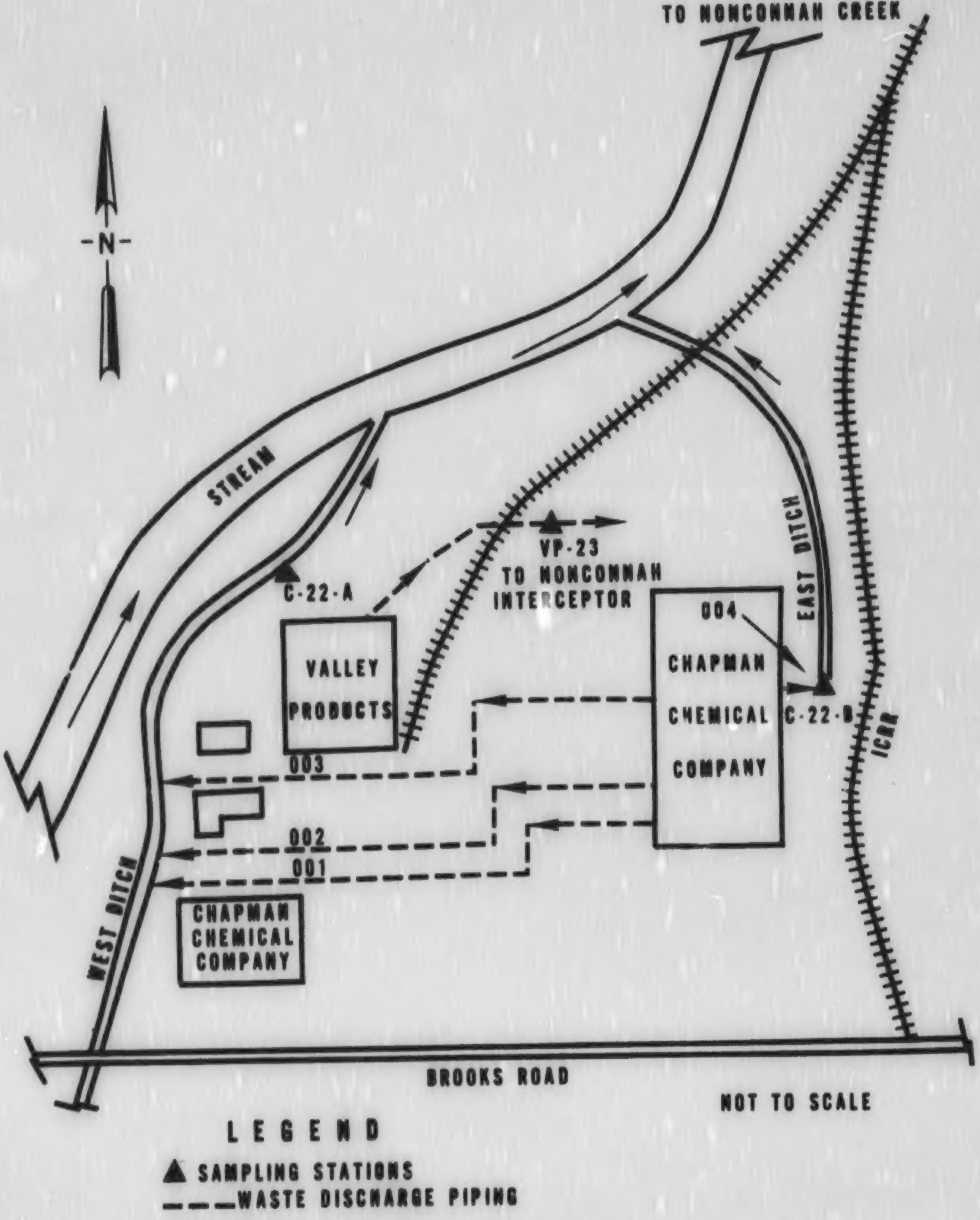


Figure C–1 Chapman Chemical Company and Valley Products Memphis, Tennessee

Sampling Stations C-22-A, C-22-B, VP-23

property from the south, normally contains some flow. At the time of the survey, the west ditch had a total flow of 0.2 mgd; the Chapman Chemical Company contribution was 0.11 mgd. The flow in this west ditch discharges into a stream that flows north to Nonconnah Creek [Figure C-1].

The water that is used for cleaning floors and vessels in the area flows into the east ditch. Prior to being discharged at point 004 [Figure C-1] this effluent passes through a carbon filter. This flow into the east ditch was 0.07 mgd. The east ditch flows north to an unnamed stream that carries the combined east and west ditch effluent to Nonconnah Creek.

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

Wastewater flows were sampled on plant property at two locations [Figure C-1]. The total flow in the west ditch (Station C-22-A) was measured using a V-notch weir. The Chapman contribution to the total flow was determined from City water usage meters. The flow in the east ditch (station C-22-B) was estimated by using a container and stop watch.

Samples were taken at approximately 60-minute intervals using a SERCO automatic sampler. The sampling was started at 8:00 AM February 22, 1972, and completed at 8:00 AM February 25, 1972. Twenty-four 1-hr samples from the SERCO were composited into one sample and an aliquot was placed in the appropriate container designated for chemical analyses. The samples requiring immediate analyses were transported to a mobile

EPA laboratory in Memphis. The other samples were preserved and shipped by air freight to the EPA (NFIC-D) laboratory. Temperature, pH, and conductivity were measured twice daily on grab samples at each location.

Discussion of Results

A summary of the analytical results from the Chapman Chemical discharges to Nonconnah Creek is presented in Table CC-1. These data indicate that the Chapman Chemical effluent discharges less than 80 pounds per day of TOC and COD. This effluent also contains 0.53 and 0.20 pounds per day of Ramrod and Atrazine, respectively. The average concentration of Ramrod (850 μg/l) in the east ditch is in violation of the effluent limit of 350 μg/l set by the Memphis and Shelby County Health Department.

D. SUMMARY AND CONCLUSIONS

1. The Chapman Chemical Company, because of its small volume of flow, does not contribute substantial quantities of oxygen-demanding materials to the receiving waters.

2. The concentration of Ramrod in the effluent is in violation of the limit set by the Memphis and Shelby County Health Department.

E. RECOMMENDATIONS

It is recommended that:

1. The Chapman Chemical Company provide pollution control facilities or in-plant controls in order to reduce the level of toxic materials, especially Ramrod, to that level set by the Memphis and Shelby County Health Department.

TABLE CC-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
CHAPMAN CHEMICAL
February 22-25, 1972

	West Ditch-C-22-A			East Ditch-C-22-B		
Parameters[a]	Range	Average	Load lb/day	Range	Average	Load lb/day
Flow, gpm		78			63	
pH	6.8-7.1			8.2-8.6		
Temperature, °C	11.5-16.0			9.5-16.0		
Conductivity, umhos/cm	140-240			140-260		
TOC	26-40	31	26	6-12	8	6
COD	15-61	35	29	9-45	25	19
Phenolic Materials	0.06-1.60	0.57	0.6	<0.05[b]	<0.05	
Copper	0.03-0.05	0.04	0.04	<0.01-0.12[b]		
Cadmium	<0.01[b]	<0.01		<0.01[b]	<0.01	
Zinc	0.14-0.24	0.17	0.14	0.04-0.11	0.07	0.05
Total Chromium	<0.01[b]	<0.01		<0.01[b]	<0.01	
Lead	0.14-0.24	0.17	0.20	0.03-0.16	0.09	0.07
Ramrod, µg/l	30-110	60	0.06	250-1,200	850	0.47
Atrazine, µg/l	18-68	49	0.05	99-360	270	0.15

---

[a] All units are in mg/l unless otherwise noted.

[b] Minimum detectable limit.

2. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with the above mentioned recommendation.

DAY AND NIGHT COMPANY
PAYNE COMPANY
DIVISION OF CARRIER CORPORATION
COLLIERVILLE, TENNESSEE

A. BACKGROUND INFORMATION

General

Day and Night Company and the Payne Company, divisions of the Carrier Corporation, produce water heaters, heating products, and air conditioners. The combined output is about 2,000 units per day. Eight hundred people are employed. The plant operates five days a week, with the majority of operations on two shifts (day and evening) and a few operations on the third shift.

The units are made by cutting and bending steel plates into the desired shape; then the surface is cleaned, treated, and painted. The entire process involves cutting oils, a cyanide pickling solution, sulfuric acid for etching, and a caustic, soapy solution for washing. A phosphate compound is used as a binder for enamel paint. Because the phosphate binder has not been satisfactory, the Company plans to return to a chromium-based binder.

The City of Collierville supplies 180,000 gallons of water per day. It is used for cooling, washing, condensing, pickling, and preparation of the metal for painting. The latter two uses consume nearly 95 percent of the water. About 75 percent of the cooling-water is recirculated.

Chronology of Contacts

George Harlow, Chief, Enforcement Branch, EPA Region IV, wrote a letter [Appendix C] during January 1972, to Reynold Kordatzky, Manager of Safety and Security, confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the Day and Night Company that information provided, as well as data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 3, 1972, Mr. Kordatzky, in a letter replying to Mr. Harlow, granted written permission to sample.

The Day and Night Company was visited on Tuesday, February 15, 1972, by E. Mann of the Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D), and Bobby W. Fisher of the Memphis and Shelby County Health Department. Day & Night's Manager of Manufacturing Services, Peter Thompson, discussed the plant operations and wastewater discharges. Arrangements were made for sampling.

B. WASTE SOURCES AND TREATMENT

All of the waste streams, including the domestic waste, combine in a manhole and are carried underground to the City of Collierville waste stabilization lagoon [Figure DN-1]. No treatment is being provided by the Day & Night Company.

An application for a permit to discharge has not been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

The wastewater stream was sampled in a manhole on plant property [Station DN-16, Figure DN-1]. A SERCO automatic sampler took one sample

31(a)

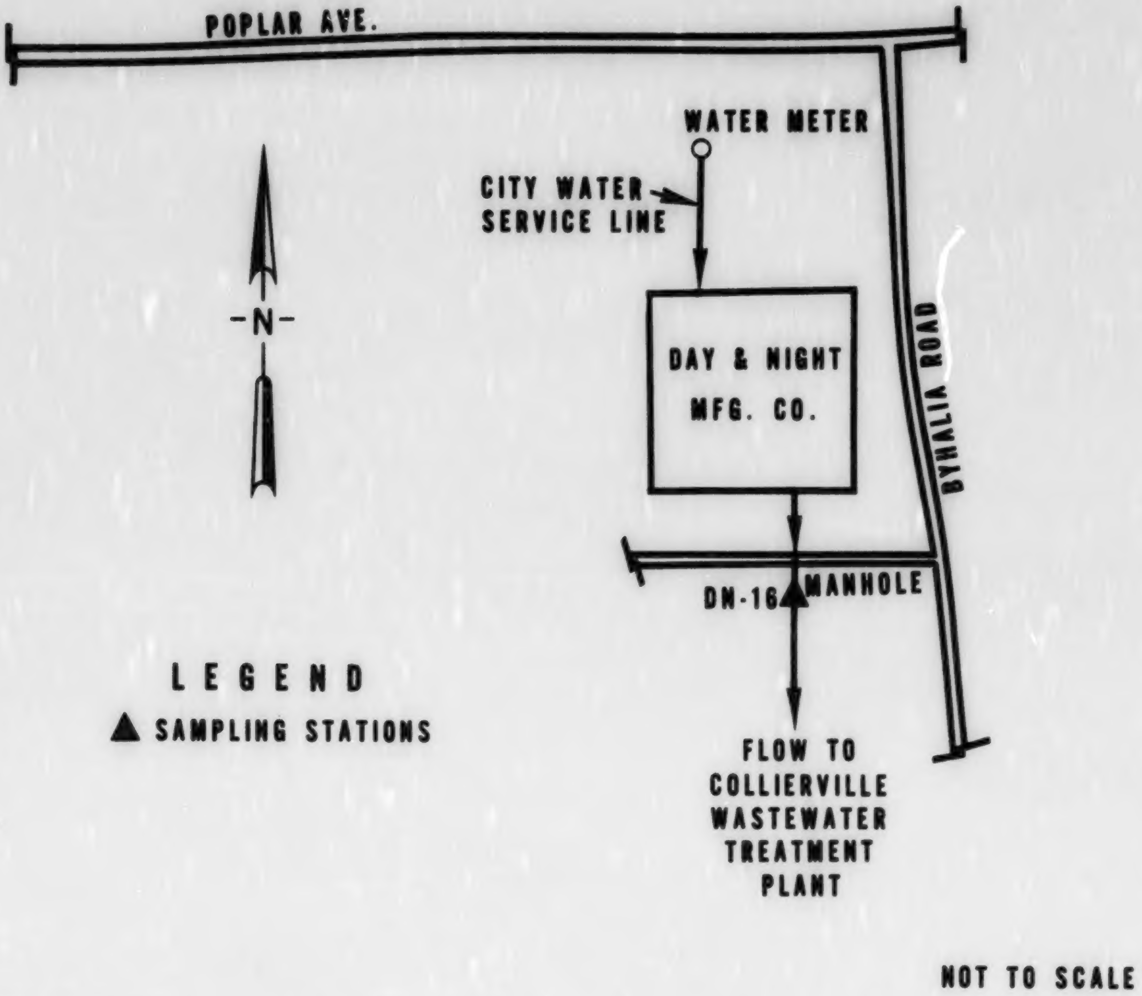


Figure DN-1 Day and Night Manufacturing Company Collierville, Tennessee Sampling Station DN-16 every hour for three 24-hour periods beginning on February 22 and ending on February 25, 1972. At the end of each period, the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory located in Memphis or shipped air freight-express to the NFIC-D laboratories. Flow readings were taken from meters measuring water flow into the plant. Grab samples were collected twice daily for temperature, pH, and conductivity, and daily for oil and grease analyses.

Discussion of Results

The pH of the wastewater [Table DN-1] varied from 5.4 to 10.7. The organic content was moderate, with average daily loadings of 193 lb of BOD; 258 lb, TOC; and 549 lb of COD. The cyanide concentration ranged from 1.7 to 2.0 mg/l and constituted an average daily loading of 2.6 lb. This concentration of cyanide can be expected to have a detrimental effect upon the biological treatment system at Collierville and, consequently, the Wolf River to which the municipal wastewater is discharged.

D. SUMMARY AND CONCLUSIONS

1. The Day & Night Company, Payne Company, Division of Carrier Corporation, discharges an effluent containing an average daily loading of 193 pounds of BOD; 258 pounds, TOC; 549 pounds, COD; 868 pounds, suspended solids; and 2.6 pounds of cyanide to the City of Collierville treatment lagoon.

2. No pretreatment of the industrial waste stream is provided by the Day & Night Company.

TABLE DN-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
DAY & NIGHT COMPANY
(Division of Carrier Corporation)
February 22-25, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd	0.169-0.179		
pH	5.4-10.7		
Temperature, °C	20.5-24.0		
Conductivity, µmhos/cm	220-650		
BOD	60-240	131	193
TOC	58-345	174	258
COD	172-634	373	549
Suspended Solids	203-1,030	593	868
Total Solids	724-1,200	894	1,310
Oil & Grease	11-23	17	24
Total Phosphorus	6.3-7.4[b]	6.8	10
Turbidity, JTU	230-650	400	
Cyanide	1.7-2.0	1.8	2.6
Copper	0.04-0.07	0.05	0.08
Cadmium	<0.01[c]	<0.01	
Zinc	1.2-1.9	1.6	2.3
Total Chromiumm	<0.01[c]-0.09	<0.04	
Lead	0.06-0.07	0.07	1.0

---

[a] All units are in mg/l unless otherwise noted.

[b] Range of two values.

[c] Minimum detectable limit.

3. Cyanide (1.7-2.0 mg/l; 2.6 lb/day) discharged from the Day & Night Company to the City of Collierville treatment lagoon can adversely affect the biota in the waste treatment system, thereby reducing treatment efficiency.

4. The Day & Night Company is considering the use of a chromium-based binder in its operations. This would increase the chromium loading going to the Collierville treatment lagoon. This lagoon cannot be expected to remove the chromium from the wastewater prior to discharge to the Wolf River.

E. RECOMMENDATIONS

It is recommended that:

1. Pretreatment be provided by the Day & Night Company, Payne Company, Division of the Carrier Corporation, for the removal of cyanide from the discharge to the City of Collierville treatment lagoon. Concentration of cyanide in the effluent shall be limited to no more than 0.1 mg/l. Also, pH control should be provided; the pH of the effluent shall be maintained between 6.0 and 9.0.

2. If a chromium-based binder is adopted, pretreatment of the effluent be required to reduce the metal to a concentration of 0.1 mg/l before wastes are discharged to the City of Collierville treatment lagoon.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 1 and 2.

DELTA REFINING COMPANY
P. O. BOX 9097
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Delta Refining Company plant is an integrated refinery that processes approximately 30,000 barrels of crude oil per day. Crude oil barged up the Mississippi is processed into gasoline; propane; jet fuels; naphtha; kerosene; diesel fuels; heating oils (Nos. 2, 5, and 6); asphalt; and petroleum solvents. The Delta refinery provides for desalting of crude oil. Company wells supply water (approx. 0.82 mgd) that is used in the following areas: cooling, 0.27 mgd; boiler feed, 0.15 mgd; process, 0.16 mgd; and sanitary system, 0.02 mgd.

The plant operates continuously; 235 people are employed.

Chronology of Contacts

On October 7, 1971, W. C. Smith, Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, Baton Rouge Field Station, EPA; and Bobby W. Fisher, Memphis and Shelby County Health Department visited the Delta Refining Company and spoke with Paul Upton, Refinery Superintendent, about the Memphis area water quality survey. He cooperated with EPA personnel and granted permission to sample.

During January, 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Upton [Appendix C] confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the Delta Refining Company that information provided, and data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under applicable laws. Written permission to sample was provided to EPA in a letter to Mr. Harlow dated February 3, 1972 from Mr. Prator, President, Delta Refining Company.

EPA personnel visited Delta Refining Company again, on February 11, 1972, and final arrangements were made for sampling.

B. WASTE SOURCES AND TREATMENT

Sanitary sewage plus other unspecified streams varying from 0.02 to 0.29 mgd are discharged to the Nonconnah Interceptor. Surface water drainage flows through a ditch into Nonconnah Creek [Figure DR-1]. Process wastes, primarily from the catalytic cracker, are treated in an API separator followed by an air flotation unit. A 30-in. diameter underground line carries the wastewater to a series of holding ponds. Storm water also enters this drainage ditch and is diverted to the second holding pond by means of a dam. The combined effluent discharges to the ditch draining to Nonconnah Creek.

A 3-in. diameter caustic line had previously entered the drainage ditch and flowed directly to Nonconnah Creek. The Company reports that this line has been terminated; however, at the time of the survey, water was flowing in this part of the ditch. This flow may have been from the caustic line or seepage from the ditch above the dam [Figure DR-1].

Data submitted to the Tennessee Water Quality Control Board [Table DR-1] indicate that the effluent was caustic and high in phenolic materials and in oil and grease.

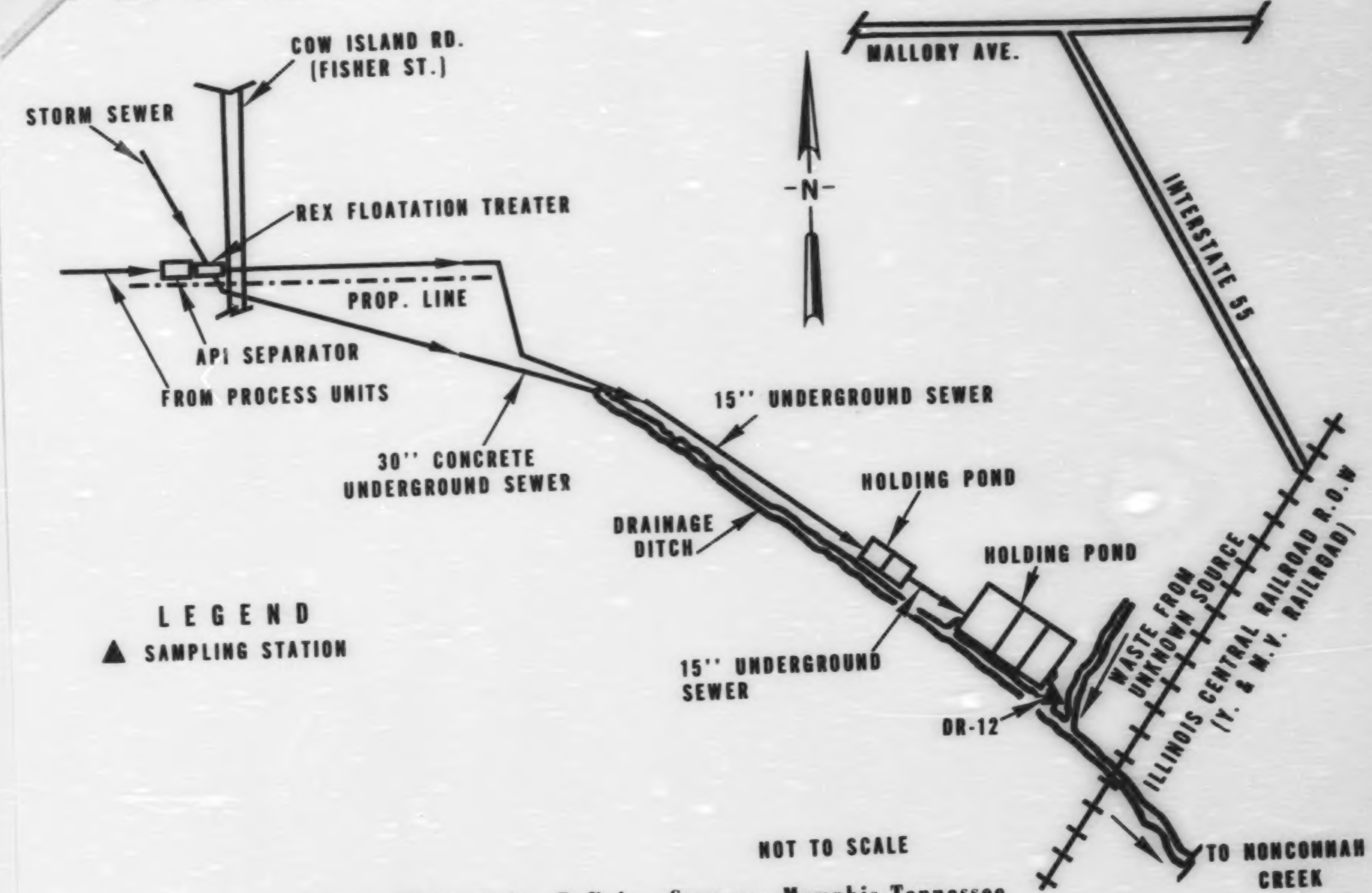


Figure DR–1 Delta Refining Company Memphis, Tennessee

Sampling Station DR-12

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The effluent of the Delta Refining Company was sampled at the holding pond discharge only [Station DR-12, Figure DR-1]. Company personnel insisted on this location, as opposed to the junction of the treatment system discharge with the unknown waste source shown in Figure DR-1. They felt that the latter location would include backflow from a battery operation downstream from the ditch [Figure DR-1]. A SERCO automatic sampler collected one sample every hour for three 24-hr periods from February 18 to 21, 1972. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the EPA NFIC-D laboratory. Flow readings were taken from a chart recorder at the API separator. Grab samples were taken twice daily for temperature, pH, and conductivity, and daily for oil and grease analyses.

Discussion of Results

At the time of the survey the flow (0.35 mgd) was about half the flow reported in the U. S. Army Corps of Engineers permit application. Previous analyses submitted to the Tennessee Water Quality Control Board [Table DR-1] indicate that, compared to the other months, the phenol and oil and grease concentrations during the time of the survey (February, 1972) were exceptionally low.

TABLE DR-1

DELTA REFINING COMPANY
DISCHARGE ANALYSES REPORTED TO THE TENNESSEE WATER QUALITY CONTROL BOARD

	Range	Average
September, 1971		
pH	9.0-9.6	
Oil & grease (mg/l)	5.3-123.8	55.4
Phenolic materials (mg/l)	21.0-83.3	35.6
October, 1971		
pH	8.2-9.6	
Oil & grease (mg/l)	10.2-53.9	31.1
Phenolic materials (mg/l)	8.3-51.3	34.7
November, 1971		
pH	9.2-10.8	
Oil & grease (mg/l)	22.3-188.5	76.5
Phenolic materials (mg/l)	31.6-56.7	40.8
February, 1972		
pH	9.0-10.4	
Oil & grease (mg/l)	1.0-57.2	11.1
Phenolic materials (mg/l)	1.3-19.5	7.5

The pH of the discharge ranged from 6.9 to 9.2 [Table DR-2]. Previous analyses submitted by the Company [Table DR-1] reveal that it is not uncommon for the pH to exceed 9.5. The concentration of oil and grease averaged 25 mg/l, or 72 lb/day. Past records for September and November, 1971 [Table DR-1] show that the concentration exceeded 100 mg/l. The concentration of phenolic materials, during the survey, averaged 32 mg/l, or 92 lb/day. In addition, there was an average of 556 lb of BOD; 447 lb, TOC; 853 lb, COD; and 1.07 lb of chromium discharged per day to Nonconnah Creek. This reach of Nonconnah Creek is classified by the Tennessee Water Quality Control Board for use for fish and aquatic life, livestock watering, and wildlife. Under the criteria established by the State no pollutants shall be added to the water in quantities that may be detrimental to any of these uses.

Delta Refining Company is contributing to the degradation of Nonconnah Creek. Should Delta decide to incorporate this waste stream into the City interceptor, the discharge must be treated further in order to insure that the pH remain below 9.5 and the oil and grease level remain below 100 mg/l -- as specified in the Memphis City Ordinance No. 490. In the event the discharge to Nonconnah Creek is continued, Delta Refining must further treat the waste stream by adopting the best practicable control technology currently available.

D. SUMMARY AND CONCLUSIONS

1. The Delta Refining Company discharges an average daily loading of 556 pounds of BOD; 447 pounds, TOC; 853 pounds, COD; 72 pounds, oil and grease; 92 pounds, phenolic materials; and 1.07 pounds of chromium into Nonconnah Creek.

TABLE DR-2

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
DELTA REFINING COMPANY
February 18-21, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd		0.35	
pH	6.9-9.2		
Temperature, °C	17.5-20.0		
Conductivity, μmhos/cm	2,800-3,500		
BOD	170-210	193	556
TOC	115-190	155	447
COD	191-372	296	853
Suspended Solids	34-83	64	184
Total Solids	1,340-2,710	1,880	5,420
Oil & Grease	19-29	25	72
Turbidity, JTU	7-90	35	
Phenolic materials	25-36	32	92
Cyanide	<0.02[b]	<0.02[b]	
Copper	<0.01[b]-0.01	<0.01	
Cadmium	<0.01-0.06	<0.03	
Zinc	0.01-0.33	0.15	0.43
Total Chromium	0.26-0.52	0.37	1.07
Lead	0.07-0.28	0.15	0.43

---

[a] All units are in mg/l except as noted.

[b] Minimum detectable limit.

2. The process water undergoes partial treatment before being discharged to Nonconnah Creek.

3. The drainage ditch that diverts storm water to the holding ponds has a high probability of overflowing or seeping to a ditch downstream and, thereby, bypassing the treatment system.

4. The discharge of oil and grease, phenolic materials, chromium, and the chemical and organic load by the Delta Refining Company into Nonconnah Creek contributes to the violation of the Federally approved water quality criteria established by the Tennessee Water Quality Control Board.

5. The Delta Refining Company has applied for a discharge permit from the U. S. Army Corps of Engineers.

E. RECOMMENDATIONS

It is recommended that:

1. Delta Refining provide pollution control facilities in order to reduce biochemical oxygen demand, and toxic or hazardous materials to levels attainable employing best practicable treatment. These levels are:

Component	lb/bbl crude	lb/day
BOD	6.7	201
Phenolic Materials	0.05	1.5
Oil and Grease	2.7	81

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of the process waste discharge to ensure compliance with the recommendations above.

4. Upon the failure of the Delta Refining Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2 appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

E. I. DUPONT DE NEMOURS & COMPANY (INC.)
P. O. BOX 27038
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The DuPont facility in the Memphis area is a petrochemical plant engaged in the manufacture of general industrial and agricultural chemicals. The plant uses an electrolytic process for the production of sodium and chlorine; a catalytic process for the manufacture of hydrogen, cyanide, hydrogen peroxide, and ammonia; and a chemical synthesis to manufacture sodium cyanide and sodium perborate. The major raw materials used in this operation are sulfuric acid, natural gas, air, and sodium chloride.

Approximately six hundred people are employed here and this plant operates continuously.

Water for plant use is provided by nine deep wells on Company property.

Chronology of Contacts

On October 4, 1971, W. C. Smith of the Environmental Protection Agency (EPA) National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, Baton Rouge Field Station, EPA; Bobby W. Fisher and Hugh Teaford, Memphis and Shelby County Health Department, conducted a preliminary inspection of the DuPont plant. DuPont representatives E. M. Burton, Ray Pittman, and John Kloss were apprised of the purpose of the survey. Dr. Burton, the plant manager, cooperated with the EPA and granted permission to sample the DuPont effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Dr. Burton [Appendix C] confirming the date of the investigation and requesting written permission to sample. This method was taken to advise DuPont that information provided, as well as data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 3, 1972, Dr. Burton, in reply to Mr. Harlow's letter, granted EPA permission to sample [Appendix C].

At the time of the survey Dr. Burton indicated it was necessary for a DuPont employee to accompany NFIC-D personnel during the time they were in the plant to sample the effluent.

B. WASTE SOURCES AND TREATMENT

The domestic waste from the plant is treated in an Imhoff tank prior to being combined with the industrial effluent [Figure DP-1]. The major wastes that contain cyanides are sent to a thermal reaction unit for cyanide oxidation. The balance of the industrial waste is treated in a neutralization system. This system [Figure DP-1] consists of a neutralization-settling pond with a detention time of eight hours and a baffled, mechanically agitated holding pond with a detention time of two hours. The effluent from this system is combined with the cooling water and with the effluent from the Imhoff tank prior to being discharged into the Loosahatchie River through a 48-in. drop line with a diffuser below the low water level. An emergency chlorine dump is included in the treatment system.

44 (a)

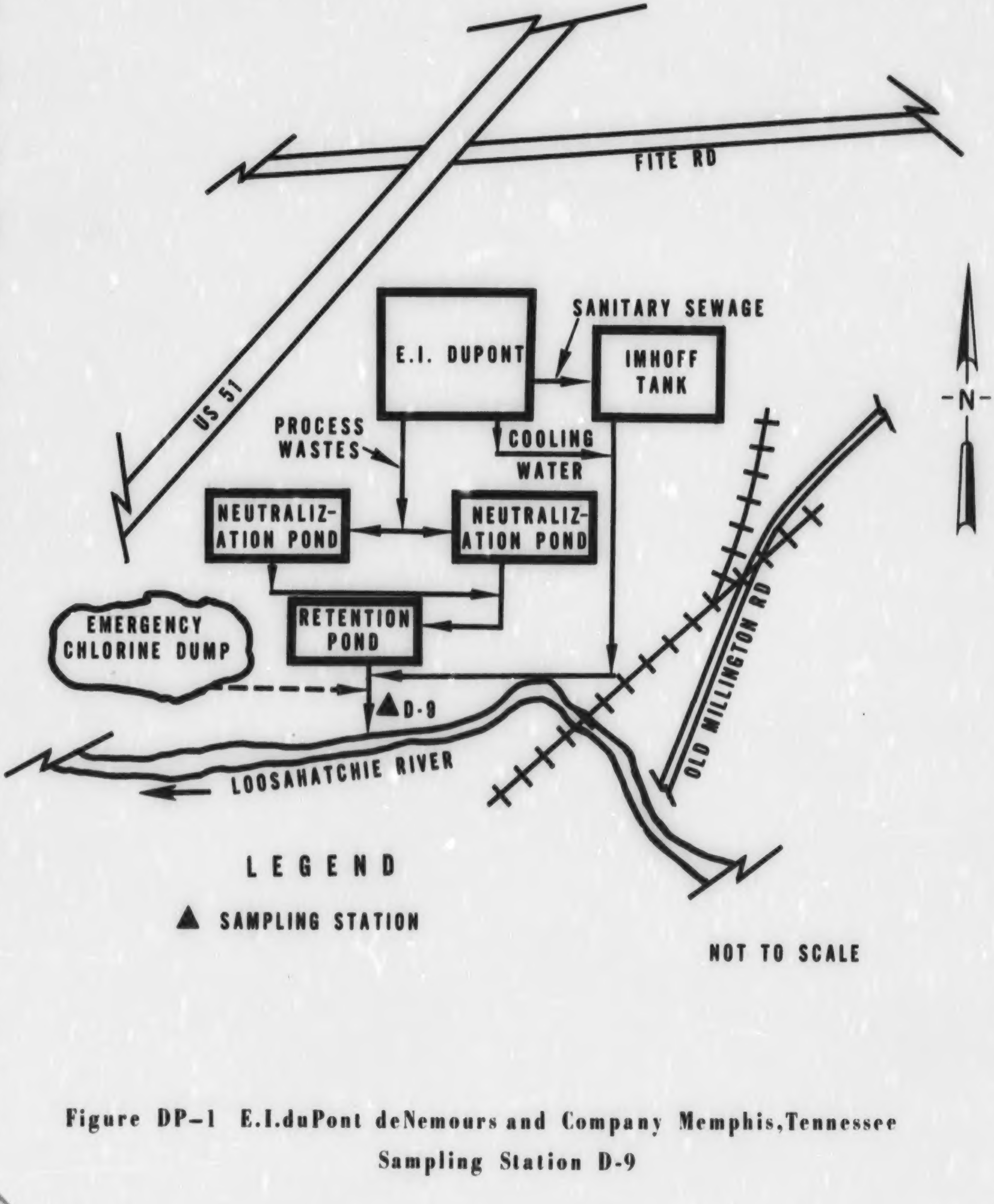


Figure DP-1 E.I.duPont deNemours and Company Memphis, Tennessee Sampling Station D-9

An application for permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge to the Loosahatchie River (D-9) was sampled on Company property at a point upstream of the inlet to the 48-in. pipeline (Figure DP-1).

A SERCO automatic sampler was used to collect an hourly sample during three 24-hr periods beginning on February 18 and ending February 21, 1972. At the end of each period the samples were composited and aliquoted into the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. A split sample was provided for the E. I. duPont Company personnel each time a composite was made. Grab samples were collected twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow readings were taken from Company flow meters for the neutralization system. In order to obtain the total effluent flow stream flow measurements were made of the combined cooling water/domestic effluent, and this value was added with that from the neutralization system.

Discussion of Results

During the time of the survey between 9.6 and 12.8 mgd of wastewater were being discharged from the DuPont plant [Table DP-1]. This

TABLE DP-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
E. I. DUPONT DE NEMOURS & COMPANY (INC.)
February 18-21, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd	9.6-12.8		
pH	7.4-9.7		
Temperature, °C	26.0-32.0		
Conductivity, μmhos/cm	900-1,250		
TOC	8-17	13	1,200
COD	22-38	32	2,760
Suspended Solids	32-100	76	7,000
Total Solids	459-886	720	65,600
Oil and Grease	5-19	10	1,000
Total Kj-N	8.4-9.2	8.9	720
N as NH_3	7.4-7.7	7.6	670
Organic N	1.0-1.6	1.4	120
N as NO_3-NO_2	<0.05[b]	<0.05[b]	
Total Phosphorus	1.36-1.44	1.39	123
Turbidity, JTU	5-14	8	
Cyanide	0.16-0.18	0.17	14
Copper	0.02-0.03	0.03	2.3
Cadmium	<0.01	<0.01	
Zinc	0.03-0.05	0.04	3.2
Total Chromium	0.03	0.03	2.7
Lead	0.03-0.07	0.05	4.5

---

[a] All units are in mg/l except as noted.

[b] Minimum detectable limit.

discharge contained 1,200 pounds of TOC; 2,760 pounds, COD; 7,000 pounds, suspended solids; and 1,000 pounds of oil and grease per day. In addition, of the 720 pounds of total nitrogen, 670 pounds were ammonia. These loadings correspond to low concentrations (7.6 mg/l ammonia); however, the large volume of wastewater being discharged makes the pollutional load substantial. The Memphis and Shelby County Health Department states that DuPont had been told about the high ammonia content in discharges in the past and had been advised not to exceed a concentration of 1.5 mg/l. This request has not been met.

The cyanide loading averaged 14 pounds per day. When combined with 3.2 pounds of zinc; 2.7 pounds of chromium; and 4.5 pounds of lead, the combination could be highly toxic. [A summary of these data is presented in Table DP-1.]

The waters of the Loosahatchie River are classified by the Tennessee Water Quality Control Board for use as habitat for fish and aquatic life; the DuPont discharge is detrimental to the water quality for this use.

At present, the DuPont Company does not have any plans to connect the wastewater discharge to the City of Memphis Interceptor. Therefore, additional wastewater treatment facilities or techniques must be incorporated before the effluent is suitable for discharge into the Loosahatchie River.

D. SUMMARY AND CONCLUSIONS

1. E. I. duPont de Nemours and Company (Inc.) is discharging an effluent containing an average daily load of 1,200 pounds of TOC;

2,760 pounds, COD; 7,000 pounds, suspended solids; 1,000 pounds, oil and grease; 670 pounds, ammonia; 14 pounds, cyanide; 3.2 pounds, zinc; 2.7 pounds, chromium; and 4.5 pounds of lead into the Loosahatchie River, a tributary of the Mississippi River.

2. The treatment facilities provided by the DuPont Company are not sufficient to reduce the pollutional load in the stream.

3. The ammonia, cyanide, zinc and other metals in the DuPont discharge to the Loosahatchie River may be highly toxic, and therefore, violate the Rivers and Harbors Act of 1899 and the water quality criteria for fish and aquatic life established by the Tennessee Water Quality Control Board.

4. E. I. duPont de Nemours and Company (Inc.) does not presently plan to connect into the City of Memphis sewer interceptor.

RECOMMENDATIONS

It is recommended that:

1. E. I. duPont de Nemours and Company (Inc.) provide in-plant measures for water conservation and re-use and improved pollution control facilities.

2. E. I. duPont de Nemours and Company (Inc.) provide pollution control facilities to reduce the loads of pollutants in the effluent, to levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
Cyanide	0.01	0.7
BOD	10	670
Total Chromium	0.05	3.4
Zinc	0.05	3.4
Ammonia	1.5	100
Suspended Solids	20	1,330
COD	40	2,660

3. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria herein outlined by December 30, 1974.

4. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 2 and 3.

5. Upon the failure of the E. I. duPont de Nemours Company (Inc.) to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1, 2, and 3, appropriate abatement proceedings, under the Rivers and Harbors Act of 1899, be initiated.

FIRESTONE TIRE AND RUBBER COMPANY
P. O. BOX 7128
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Firestone plant in Memphis is one of the largest of the 55 Firestone factories in the U.S. and overseas. The Memphis factory was completed around 1936. The raw materials received by the plant include natural and synthetic rubber, nylon, rayon, and polyester materials together with steel bead wire, pigments, and oils. At this factory Firestone assembles and cures rubber tires; compounds and mixes rubber materials; processes tire components, and engages in inspection, warehousing, and shipping. End products consist of heavy duty tires, flaps, retread tires, and passenger tires.

A unique feature of the Memphis factory is the Firestone Xylos Recovery or Reclaim Plant. The Xylos plant receives scrap tires and, by means of shredding, cooking, etc., reconditions old rubber for re-use. Part of the reclaimed rubber is used in the Memphis plant and the remainder is distributed to other Firestone plants. The Xylos plant generates a major portion of the liquid waste loads from this Firestone installation. Much of this waste load is from the sludge tank discharge inside the Xylos plant.

Chronology of Contacts

On October 6, 1971, E. J. Struzeski, Environmental Protection Agency (EPA) National Field Investigations Center-Denver (NFIC-D), and Hugh Teaford, Memphis and Shelby County Health Department, conducted a preliminary inspection of the Firestone plant. Clarence Colby, Plant

Engineer, was apprised of the purpose of the survey. He cooperated with the EPA and granted permission to sample the plant effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Colby [Appendix C] confirming the date of the investigation and requesting written permission to sample. This method was taken to advise Firestone that information provided, as well as data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 1, 1972, Mr. Colby, in reply to Mr. Harlow's letter, granted EPA permission to sample [Appendix C].

B. WASTE SOURCES AND TREATMENT

Rubber fines and soluble organic compounds originating in the rubber reclaiming plant are the major waste constituent.

The Firestone plant uses in-plant controls, but there is no treatment of the wastes being discharged. The effluent from the plant is divided into two streams; the first being the "heavy" or highly concentrated waste. This effluent flow (F-18-A) is measured in a Parshall flume and then discharged to the Wolf Interceptor [Figure F-1]. The second effluent (F-18-B) is designated as cooling water and is discharged, without being measured, into Leath Bayou and thence via Cypress Creek to the Wolf River.

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers for effluent F-18-B. No application has been filed for F-18-A.

51 (a)

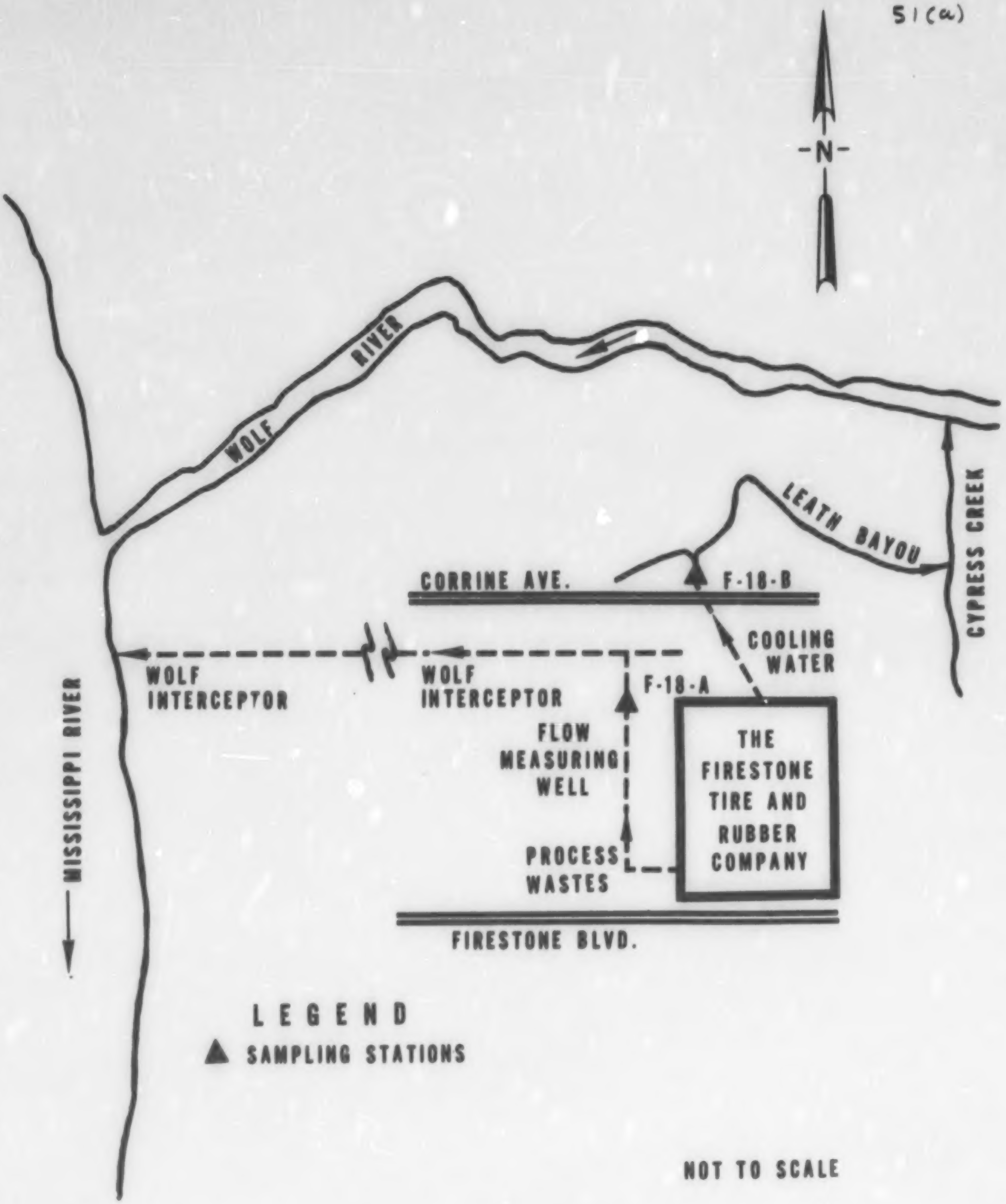


Figure F–1 The Firestone Tire and Rubber Company Memphis, Tennessee Sampling Stations F-18-A, F-18-B

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge to the Wolf Interceptor (F-18-A) was sampled on Company property at a point downstream from the flow-measuring device [Figure F-1]. A SERCO automatic sampler was used and, beginning on February 22 and ending February 25, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. Grab samples were collected twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow readings were taken from a Company flow meter.

The discharge to Leath Bayou (F-18-B) was sampled at the point where the 72-in. cooling-water pipe discharged into the stream [Figure F-1]. A SERCO automatic sampler was used and, beginning on February 22 and ending February 25, 1972, a sample was collected every hour for three 24-hr periods. These samples were handled in the manner previously described. Grab samples were taken twice daily in order to obtain temperature, pH, and conductivity measurements. Effluent flow measurements were conducted by EPA personnel.

At the time of the survey, the Firestone Tire and Rubber Company was discharging between 0.13 and 0.39 mgd wastewater to the Wolf Interceptor. This discharge (F-18-A) had a pH between 4.7 and 5.8 and contained 1,700 mg/l BOD, 3,860 mg/l TOC, and 9,130 mg/l COD [Table F-1].

TABLE F-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
FIRESTONE TIRE AND RUBBER COMPANY
February 22-25, 1972

Parameter[a]	F-18-A Range	F-18-A Average	F-18-A Load lb/day	F-18-B Range	F-18-B Average	F-18-B Load lb/day
Flow, mgd	0.13-0.39				4.94[b]	
pH	4.7-5.8			6.9-7.2		
Temperature, °C	37.0-39.0			23.5-26.0		
Conductivity, µmhos/cm	400-775			160-200		
BOD	1,600-1,800	1,700	3,280			
TOC	3,550-4,160	3,860	7,720	3-30	17	700
COD	6,120-13,800	9,130	21,300	38-76	56	2,310
Suspended Solids	1,680-3,800	2,510	5,860	51-325	146	6,020
Total Solids	3,450-6,030	4,460	9,920	168-527	290	12,000
Oil and Grease	390[d]-860	530	1,100		4,100[b]	
Turbidity, JTU	40-220	150		20-220	88	
Phenolic Materials	3.5-5.8[d]	4.5	9.7	0.26-0.33[c]	0.3	12.4
Copper	0.08-0.34	0.18	0.46	0.06-0.27	0.15	6.2
Cadmium	<0.01[e]-0.03	<0.02		<0.01[e]		
Zinc	5.9-9.3	7.3	15.9	0.09-0.21	0.15	6.2
Total Chromium	0.02-0.04	0.03	0.05	<0.01[d]		
Lead	0.45-0.76	0.59	1.3	<0.03[e]-0.03	<0.03	

---

a/ All units are in mg/l except as noted.
b/ Single instantaneous reading.
c/ Range of two values.
d/ Sample analyzed after maximum preservation time had expired.
e/ Minimum detectable limit.

These values corresponded to average daily loadings of 3,280 pounds of BOD; 7,720 pounds, TOC; and 21,300 pounds of COD.

The wastewater was turbid (150 JTU, avg) and contained 2,510 mg/1 (5,860 lb/day) suspended solids and 4,460 mg/1 total solids. In addition, the effluent being discharged contained 1,100 pounds of oil and grease (580 mg/1) and 9.7 pounds of phenolic materials (4.5 mg/1).

The Memphis Ordinance No. 460 prohibits the discharge of wastewater having a pH below 5.5, oil and grease concentration exceeding 100 mg/1, or a high content of phenolic materials. These heavy loadings of oxygen-demanding materials in the wastewater will cause an excessive loading on the waste treatment facilities (North Treatment Plant) that are to be constructed by the City of Memphis. Phenolic materials and oil and grease may be toxic to the biota in the treatment system, thereby reducing the effectiveness of the treatment.

The reach of the Mississippi that now receives the discharge from the Wolf Interceptor is classified by the Tennessee Water Quality Control Board for industrial uses, fish and aquatic life, irrigation, livestock watering, wildlife, and navigation. Under the criteria established by the State there shall be no substances added to the waters that will produce conditions detrimental to these uses.

The Firestone Tire & Rubber Company has a second discharge (F-18-B) into Leath Bayou which drains to Cypress Creek and thence to the Wolf River. This discharge had a greater flow (4.94 mgd), and the TOC and COD concentrations were 17 mg/1 and 56 mg/1, respectively. These values correspond to a daily average discharge of 700 pounds of TOC and 2,310 pounds of COD. An instantaneous measurement for oil and grease was exceptionally high with a concentration of 4,100 mg/l. Further, 12.4 pounds of phenolic materials were being discharged.

Although Firestone has taken certain in-plant measures to segregate strong waste streams to prevent their discharge to Leath Bayou, the Company must further remove the source of oil and grease and of phenolic materials from this discharge. This waste stream should then be combined with the stream now going to the interceptor and be pretreated.

D. SUMMARY AND CONCLUSIONS

1. The Firestone Tire and Rubber Company in Memphis, Tennessee discharges, into the Mississippi River through the Wolf Interceptor, wastewater containing 1,700 mg/l BOD, 3,860 mg/l TOC, 9,130 mg/l COD, 2,510 mg/l suspended solids, 580 mg/l oil and grease and 4.5 mg/l phenol. These values amount to an average daily loading of 3,280 pounds of BOD; 7,720 pounds, TOC; 21,300 pounds, COD; 5,860 pounds, suspended solids; 1,100 pounds, oil and grease; and 9.7 pounds of phenolic materials. A U. S. Army Corps of Engineers discharge permit application has not been filed for this effluent.

2. Firestone does not provide pretreatment before the wastewater enters the sewer system.

3. Lack of a municipal waste treatment system results in untreated industrial wastewaters being discharged directly to the Mississippi River via the interceptor system.

4. The high contents of oxygen-demanding materials, solids, oil and grease, and phenolic materials, and the pH fluctuation in the

Firestone discharge contributes to the violation of the Federally approved water quality criteria for the Mississippi River, as established by the Tennessee Water Quality Control Board.

5. The pH range and the concentrations of oil and grease and phenolic materials violate sections of the Memphis City Ordinance (No. 460).

6. The discharge of industrial wastes, with high pollutional loadings, into the Mississippi River without a permit from the U. S. Army Corps of Engineers is a violation of section 407, Rivers and Harbors Act of 1899 (33 USC: 401-413).

7. In the contact stabilization sewage treatment plant, which is planned to eventually treat wastewater carried by the Wolf Interceptor, the oil and grease and phenolic materials in the Firestone discharge may be toxic to the biota in the treatment system, and thereby impair the treatment of municipal wastes.

8. The Firestone Tire & Rubber Company also discharges an effluent containing high concentrations of oil and grease, and average daily loadings of 700 pounds of TOC; 2,310 pounds, COD; 6,030 pounds suspended solids; and 12.4 pounds of phenolic materials into the Wolf River via Leath Bayou and Cypress Creek. An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers for this effluent.

9. The absence of treatment of this stream causes material toxic to fish and aquatic life to reach the Wolf River and thereby violates the Rivers and Harbors Act of 1899.

10. Although the Firestone Tire & Rubber Company is practicing in-plant stream segregation to prevent strong wastes from entering the Wolf River, the waste segregation program has not succeeded in removing a significant pollutional load from the discharge.

E. RECOMMENDATIONS

It is recommended that:

1. Firestone Tire & Rubber Company provide pollution control facilities for its discharge to the Wolf Interceptor (F-18-A) in order to reduce biochemical oxygen demand, chemical oxygen demand, solids, oil and grease, and phenolic materials to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	60
COD	100	200
Suspended Solids	30	60
Oil & Grease	5	10
Phenolic Materials	0.1	0.2

The pH of the wastewater discharges shall be not less than 5.5 or greater than 9.5.

2. The waste segregation program adopted by Firestone be further applied to the waste stream entering Leath Bayou (F-13-B) in order to remove the high oil and grease and phenol content from this discharge and to combine it with the other strong process wastes that must be pretreated before discharge to the Wolf Interceptor. Pollutants in this discharge should be reduced to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
Suspended Solids	30	1,250
Oil & Grease	5	200
Phenolic Materials	0.1	4.0

3. An implementation schedule for the pollutaion control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

4. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 1, 2, and 3.

5. Upon the failure of the Firestone Tire & Rubber Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1, 2, and 3 appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

W. R. GRACE & COMPANY
AGRICULTURAL CHEMICALS GROUP
P. O. BOX 27147
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The plant of W. R. Grace & Company, Agricultural Chemicals Group, is situated on the Loosahatchie River about five miles north of the City of Memphis. This plant receives natural gas, sulfuric acid, caustic soda, monoethanolamine, and other products and is principally engaged in the synthesis of ammonia from natural gas and of urea from ammonia and carbon dioxide.

The plant operates continuously and employs approximately 350 people.

The water (1.9 mgd) used by the plant is provided by deep wells on Company property.

In May, 1971, the Tennessee Water Quality Control Board advised W. R. Grace of standards for the various pollutants in its discharge. The State commented on excessive concentrations of urea that, in turn, hydrolizes to ammonia and carbon dioxide; cyanide is also a potential decomposition product of urea. The State warned W. R. Grace that the zinc in the effluent, when combined with cyanide, results in synergistic effects. The Tennessee Water Quality Control Board recommended the following effluent limitations:

pH	6.0-9.0	Turbidity	50 units or less
Cyanide	0.01 mg/l or less	Total Chromium	0.05 mg/l or less
BOD_5	10 mg/l or less	Zinc	0.1 mg/l or less
Color	50 units or less	Ammonia	1.5 mg/l or less

The following compliance schedule was recommended for W. R. Grace:

For correction of chrome and zinc discharges;

Submittal of preliminary engineering report: July 1, 1971
Submittal of plans and specifications: October 1, 1971
Initiation of construction: February 1, 1972
Initiation of operation: April 1, 1973

For correction of ammonia and other discharges:

Submittal of preliminary engineering report: July 1, 1972
Submittal of plans and specifications: January 1, 1973
Initiation of construction: July 1, 1973
Initiation of operation: July 1, 1974

In September 1971, the Memphis and Shelby County Health Department noted that the W. R. Grace effluent continued to show a high ammonia content.

Chronology of Contacts

On October 4, 1971, Wayne C. Smith of the Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, Baton Rouge Field Station, EPA; Bobby W. Fisher and Hugh Teaford, Memphis and Shelby County Health Department, conducted a preliminary inspection of the W. R. Grace & Company plant. Robert M. Stewart, Plant Manager, and Frank Applegate, Assistant Plant Manager, were apprised of the purpose of the survey. Mr. Stewart said that he would answer any questions the EPA posed but would have to confer with his legal staff before granting permission to sample the W. R. Grace effluent. On October 6, 1971, Mr. Stewart granted permission to sample this discharge.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Stewart [Appendix C], confirming the date of the investigation and requesting written permission to sample. This method was taken to advise W. R. Grace that information provided, and data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 3, 1972, Mr. Stewart, in a reply to Mr. Harlow's letter, granted permission to sample [Appendix C].

At the time of the survey Mr. Stewart indicated it was necessary for a W. R. Grace employee to accompany NFIC-D personnel during the time they were in the plant to sample the effluent.

B. WASTE SOURCES AND TREATMENT

The process water from the production of ammonia and urea is the major contribution to the presence of alkalinity, total solids, ammonia, and urea. This wastewater may contain cyanides.

Domestic wastewaters at W. R. Grace are treated in an Imhoff tank prior to being mixed with the industrial wastewaters. These combined wastes flow into a settling pond, and the pond effluent passes into a small final lagoon [Figure G-1]. The floating oil on this final lagoon is removed by an oil skimmer and burned. The effluent from the lagoon flows, via an open ditch, into the Loosahatchie River.

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

61 (a)

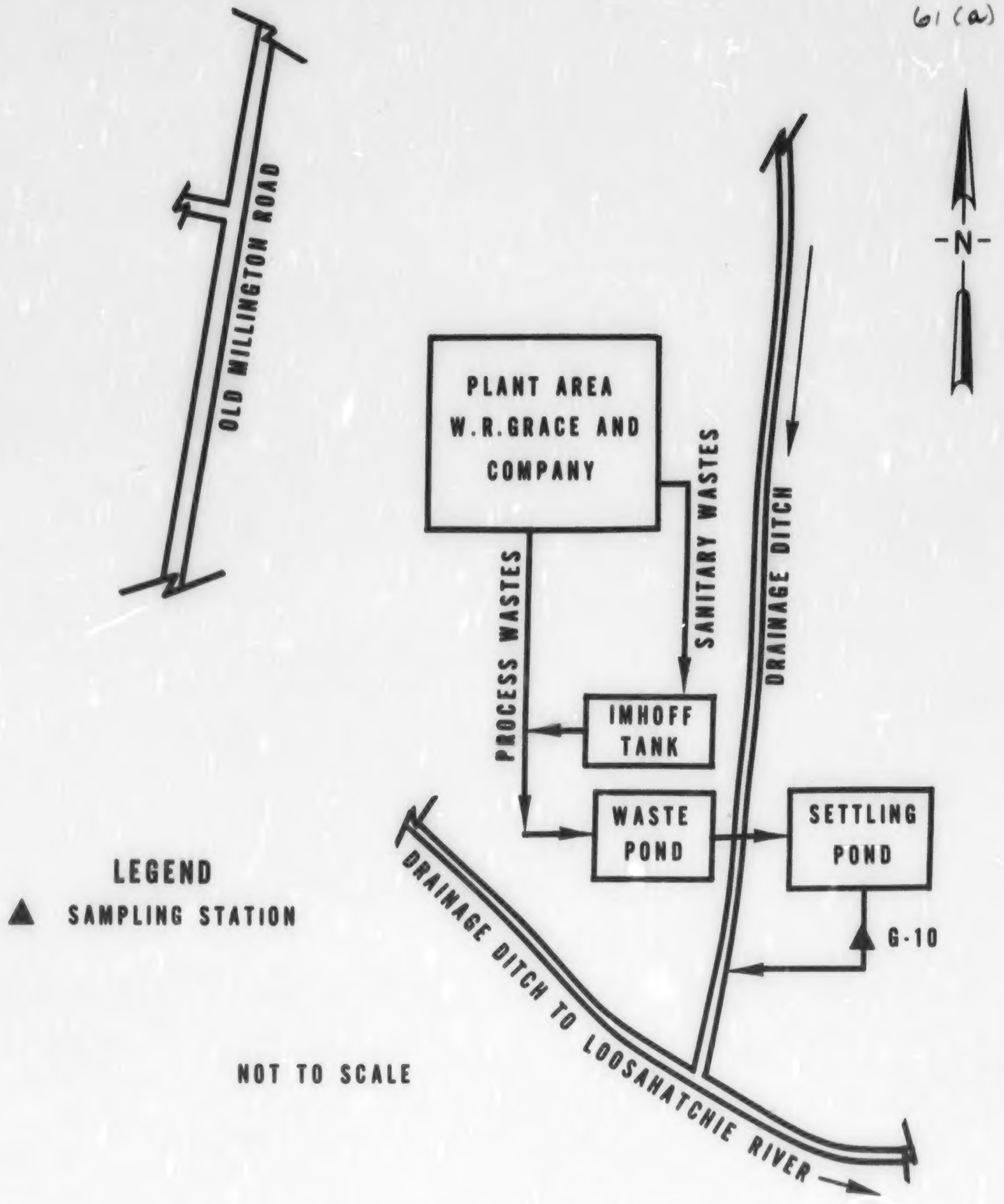


Figure G-1 W.R.Grace and Company Memphis,Tennessee Sampling Station G-10

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

The discharge to the Loosahatchie River (C-10) was sampled on Company property at a point upstream of the flow measuring device [Figure C-1]. A SERCO automatic sampler was used, and beginning on February 18 and ending February 21, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. Whenever possible, the W. R. Grace Company personnel were provied with a split sample. Grab samples were taken twice daily in order to obtain temperature, pH, and conductivity and once per day for oil and grease analyses. Flow readings were taken from Company flow meters.

Discussion of Results

At the time of the survey, between 1.30 and 1.95 mgd of wastewater was being discharged to the Loosahatchie River. The pH varied between 6.8 and 8.8. The BOD averaged 10 mg/l and the turbidity ranged from 9 to 13 JTU. All of these levels were just within the limits recommended by the Tennessee Water Quality Control Board.

The discharge contained an average daily loading of 122 pounds of BOD; 779 pounds, TOC; 634 pounds, COD; and 21 pounds of oil and grease.

The nutrient level was very high. The ammonia concentration averaged 111 mg/l and the organic nitrogen averaged 99 mg/l. These corresponded to average loadings of 1,320 and 1,170 pounds per day, respectively.

The State recommended limit of 1.5 mg/l (18.8 lb/day) ammonia in the effluent has not been adhered to. The concentration of zinc averaged 0.77 mg/l, or 9.1 lb/day, and the cyanide averaged 0.06 mg/l. This is in excess of the State recommended levels of 0.10 mg/l zinc (or 1.25 lb/day) and 0.01 mg/l cyanide. In addition, the synergistic effects of zinc and cyanide increase the toxicity of the waste stream. The chromium concentration averaged 2.0 mg/l (23.8 lb/day), a value that was also in excess of the limit recommended by the State (0.05 mg/l or 0.63 lb/day). The receiving waters of the Loosahatchie River are classified by the Tennessee Water Quality Control Board for fish and aquatic life. The discharge by the W. R. Grace Company makes the water unfit for this use and, therefore, violates the water quality standards. [A summary of these data is presented in Table G-1.]

The wastewater treatment provided by W. R. Grace is inadequate for handling the toxic load. The Company had not followed the implementation schedule suggested by the State. Furthermore, W. R. Grace has not been making a satisfactory effort to improve the treatment of its discharge. The wastewater can be highly toxic and is contributing to the degradation of the water quality of the Loosahatchie River.

D. SUMMARY AND CONCLUSIONS

1. W. R. Grace & Company discharges, to the Loosahatchie River, an average daily loading of 122 pounds of BOD; 779 pounds, TOC; 634 pounds, COD; 210 pounds, oil and grease; 1,320 pounds, ammonia; 1,170 pounds, organic nitrogen; 0.7 pounds, cyanide; 9.1 pounds, zinc; and 23.8 pounds of chromium.

TABLE G-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
W. R. GRACE & COMPANY
AGRICULTURAL CHEMICALS GROUP
February 18-21, 1972

Parameter[a]	Range	Average	Load lb/day
Flow (mgd)	1.30-1.95		
pH	6.8-8.8		
Temperature (°C)	32.5-37.5		
Conductivity (µmhos/cm)	1,600-2,300		
BOD	10-11	10	122
TOC	45-83	67	779
COD	20-107	51	634
Suspended Solids	26-61	47	557
Total Solids	709-981	868	10,300
Oil & Grease	12-21	17	210
Total Kj-N	160-270	210	2,480
N as NH_3	70-150	111	1,320
Organic-N	87-120	99	1,170
N as NO_2-NO_3	0.05[b]	0.05[b]	
Total Phosphorus	0.14-0.22	0.19	2.2
Turbidity (JTU)	9-13	12	
Cyanide		0.06[c]	0.7
Copper	0.01-0.02	0.02	0.19
Cadmium	0.01	0.01	0.12
Zinc	0.67-0.85	0.77	9.1
Total Chromium	1.4-2.4	2.0	23.8

---

[a] All units are in mg/l except as noted.
[b] Minimum detectable limit.
[c] One value.

2. The levels of ammonia, zinc, cyanide, and chromium in the W. R. Grace discharge stream are in excess of those recommended by the Tennessee Water Quality Control Board. These toxic contaminants violate the Rivers and Harbors Act of 1899 and may violate the water quality criteria of the Loosahatchie River which is classified by the Tennessee Water Quality Control Board for fish and aquatic life.

3. The wastewater facilities provided by the Company are not adequate. Although an abatement schedule has been set by the Tennessee Stream Pollution Control Board, W. R. Grace and Company does not appear to be making any attempt to improve these facilities.

4. An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

E. RECOMMENDATIONS

It is recommended that:

1. W. R. Grace & Company improve waste treatment facilities in order to reduce the ammonia, cyanide, chromium and zinc in the discharge to the levels recommended by the Tennessee Water Quality Control Board.

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with the Recommendation Numbers 1 and 2.

4. Upon the failure of the W. R. Grace & Company Agricultural Chemicals Group to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2, appropriate abatement proceedings under the Rivers and Harbors Act of 1899 be initiated.

HUMKO PRODUCTS
CHEMICAL DIVISION
POPE STREET
P. O. BOX 398
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The HumKo Products (Pope Street) facility is a chemical plant that manufactures fatty acids, glycerides, and nitrogen derivatives from animal and vegetable fats, fish oils, and other natural fats. The process consists of refining, hydrogenation, hydrolysis, and distillation. The plant operates continuously and employs 225 people. The water supply for this operation is provided by the City and this water is used for cooling, processing, and cleaning.

Chronology of Contacts

On October 6, 1971, W. C. Smith, Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D), Joseph Alleman, Baton Rouge Field Station, EPA, and Bobby W. Fisher, Memphis and Shelby County Health Department, conducted a preliminary inspection of the HumKo Products (Pope Street) plant. HumKo Products Manager of Design Allen Fritsche and Plant Manager Robert Wiggins were apprised of the purpose of the survey. Mr. Fritsche cooperated with EPA and granted permission to sample the plant effluent. (Mr. Fritsche was acting in behalf of Curt Meierhoefer, Vice President, Engineering, during this plant inspection.)

George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter [Appendix C] during January 1972 to Mr. Fritsche, confirming the date of the investigation and requesting written permission to sample. This method was taken to advise HumKo Products (Pope Street) that information provided, as well as data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 3, 1972, Mr. Meierhoefer, in reply to Mr. Harlow's letter, granted EPA permission to sample [Appendix C].

At the time of the survey Mr. Wiggins indicated it was necessary for a HumKo employee to accompany NFIC-D personnel during the time they were in the plant to sample the effluent.

B. WASTE SOURCES AND TREATMENT

The major source of waste is the process water that normally contains large amounts of organic materials. Prior to discharge into Workhouse Bayou and thence to the Wolf River, the wastewater is pretreated for oil and grease removal by means of pH control and an air-flotation unit.

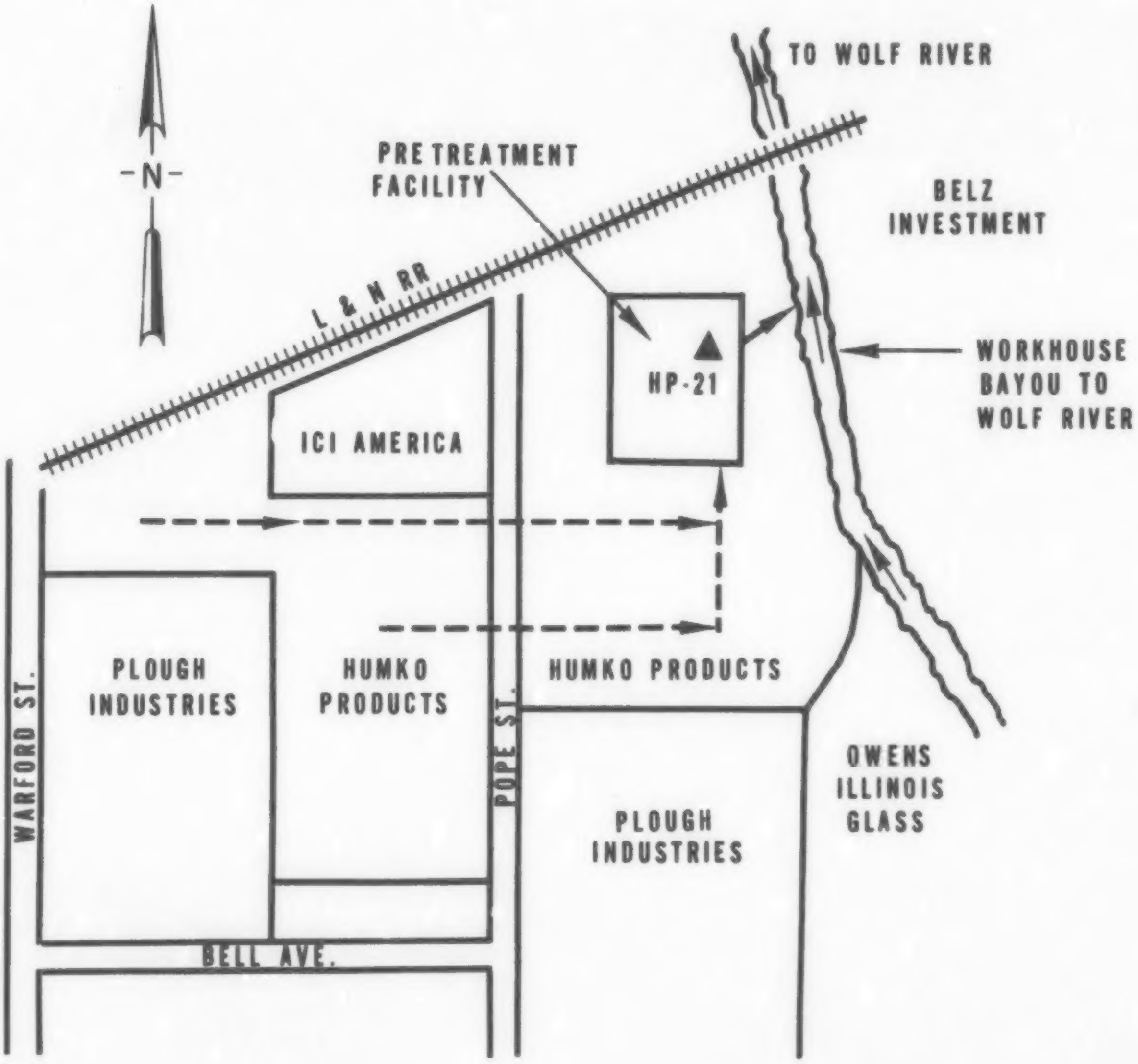
An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedures

The discharge to Workhouse Bayou (HP-21) was sampled on Company property at a point downstream from the air-flotation unit [Figure HP-1]. A SERCO automatic sampler was used and, beginning on February 22 and ending February 25, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and

68 (a)



LEGEND

▲ SAMPLE POINT

NOT TO SCALE

Figure HP-1 Humko (Pope) Flow Diagram

aliquoted into the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. Whenever possible, a split sample was provided the personnel of HumKo Products (Pope Street). Grab samples were taken twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow readings were taken from Company flow meters.

Discussion of Results

At the time of the survey HumKo was discharging an average of 0.7 mgd of wastewater to Workhouse Bayou and thence to the Wolf River. The discharge was caustic, with a pH range of 7.8 to 11.5 [Table HP-1]. The effluent contained a daily average loading of 11,400 pounds of BOD; 4,240 pounds, TOC; and 21,500 pounds of COD. These loads correspond to concentrations of 2,070 mg/l BOD; 748 mg/l TOC and 3,930 mg/l COD. In addition, there were 3,700 pounds oil and grease (630 mg/l) and 22 pounds phenolic materials (3.7 mg/l). Although HumKo Products (Pope Street) has installed an air flotation unit to pretreat its waste, the system is not adequate. As a result, a high strength waste is being discharged into the Wolf River via Workhouse Bayou.

The reach of the Wolf River receiving the discharge from Workhouse Bayou is classified for fish and aquatic life. The strong waste now being discharged by the HumKo firm can be detrimental to the water quality for this use.

Company officials plan to connect the discharge from the Pope Street plant to the City of Memphis interceptor system. According

TABLE HP-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
HUMKO PRODUCTS CHEMICAL DIVISION
(POPE STREET)
February 22-25, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd	0.609-0.748		
pH	7.8-11.5		
Temperature, °C	28.5-36.0		
Conductivity, μmhos/cm	1,200-8,000		
BOD	1,500-2,900	2,070	11,400
TOC	670-800	748	4,240
COD	1,800-5,700	3,930	21,500
Suspended Solids	123-1,300	685	3,980
Total Solids	2,280-3,540	2,770	15,900
Oil & Grease	330-860	630	3,700
Turbidity, JTU	450-1,000	650	
Phenolic Materials	0.24-7.0	3.7	22
Cyanide	<0.02[b]		
Copper	0.06-0.10	0.08	0.43
Cadmium	<0.01[b]		
Zinc	0.19-0.44	0.28	1.6
Total Chromium	<0.01[b]-0.02	<0.02	
Lead	0.12-0.16	0.14	0.78

---

a/ All units are in mg/l except as noted.
b/ Minimum detectable value.

to the Memphis Ordinance No. 460, Article 5(j) prohibits the discharge of any waste having a pH in excess of 9.5. Article 5(b) prohibits concentrations of oil and grease exceeding 100 mg/l. In addition, it is prohibited to discharge wastewater containing phenolic materials or BOD and COD in such quantities that would cause a significant load on the sewage works. The discharge from HumKo Products violates these aspects of the City Ordinance. Further treatment of the wastewater stream must be provided for by HumKo Products in order to make the effluent suitable for discharge to the City interceptor.

D. SUMMARY AND CONCLUSIONS

1. HumKo Products Chemical Division (Pope Street) is discharging an average daily load of 11,400 pounds of BOD; 4,240 pounds, TOC; 21,500 pounds, COD; 3,700 pounds, oil and grease; and 22 pounds of phenolic materials into Workhouse Bayou which drains into the Wolf River. This discharge is a violation of the Rivers and Harbors Act of 1899.

2. Although an air flotation unit has been installed to pretreat the waste, the system is inadequate, and the HumKo discharge is grossly polluting Workhouse Bayou.

3. If HumKo Products connects to the City sewer system, the pH, the concentration of oil and grease and phenolic materials, the large amounts of chemical and organic matter, would violate the Memphis Ordinance No. 460.

E. RECOMMENDATIONS

It is recommended that:

1. HumKo Products (Pope Street) provide additional pollution

control facilities to reduce the pollutants to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	170
COD	100	560
Suspended Solids	30	170
Oil & Grease	5	30
Phenolic Materials	0.1	0.6

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 1 and 2.

4. Upon the failure of HumKo Products Chemical Division to provide a satisfactory document to achieve the goals identified in Recommendations 1 and 2 appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

HUMKO PRODUCTS
(Thomas Street)
P. O. BOX 398
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The HumKo Products (Thomas Street) operation is a chemical plant engaged in the manufacture of edible vegetable and salad oils. They are made by refining, bleaching, deodorizing, and plasticizing fats and oils. Water (approx. 6.2 mgd) used by the plant comes from wells on Company property. This water is used for cooling and processing.

The plant employs 410 people and operates continuously.

Chronology of Contacts

On October 6, 1971, W. C. Smith, of the Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, Baton Rouge Field Station, EPA; and Bobby W. Fisher, Memphis and Shelby County Health Department, conducted a preliminary inspection of the HumKo Products (Thomas Street) plant. HumKo Products' Manager of Design Allen Fritsche and Plant Manager J. Crafton were apprised of the purpose of the survey. Mr. Fritsche cooperated with EPA and granted permission to sample the HumKo Products (Thomas Street) effluent. (Mr. Fritsche was acting in behalf of Curt Meierhoefer, Vice President, Engineering, during this plant inspection.)

George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter [Appendix C], during January 1972, to Mr. Fritsche, confirming the date of the investigation and requesting written permission to sample. THis method was taken to advise HumKo Products (Thomas Street) that information provided and data regarding discharges from the premises of the Company may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 3, 1972, Mr. Meierhoefer replied to Mr. Harlow's letter, granting EPA permission to sample [Appendix C].

At the time of the survey Mr. Crafton indicated it was necessary for a HumKo employee to accompany NFIC-D personnel during the time they were in the plant to sample the effluent. B. E. Benson and U. Z. Hardy of NFIC-D, on February 16, 1972, made final sampling arrangements.

B. WASTE SOURCES & TREATMENT

The major discharge (approx. 5.0 mgd) is pretreated by pH control and air flotation for oil and grease removal prior to being discharged to the Wolf Interceptor. The second effluent stream (approx. 1.2 mgd) is discharged, without pretreatment, into Leath Bayou, Cypress Creek, and eventually into the Wolf River. A U.S. Army Corps of Engineers permit application has been filed for the second discharge, but none has been filed for the major effluent stream that discharges into the Wolf Interceptor. The sanitary wastes plus boiler blowdown are discharged to the Wolf Interceptor. The two major process-waste streams were designated at HT-11-A (untreated) and HT-11-B (treated) for this survey [Figure HT-1].

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

Wastewater flows were sampled on plant property at the designated locations [Figure HT-1]. Flow from the major wastewater stream (HT-11-B)

74 (a)

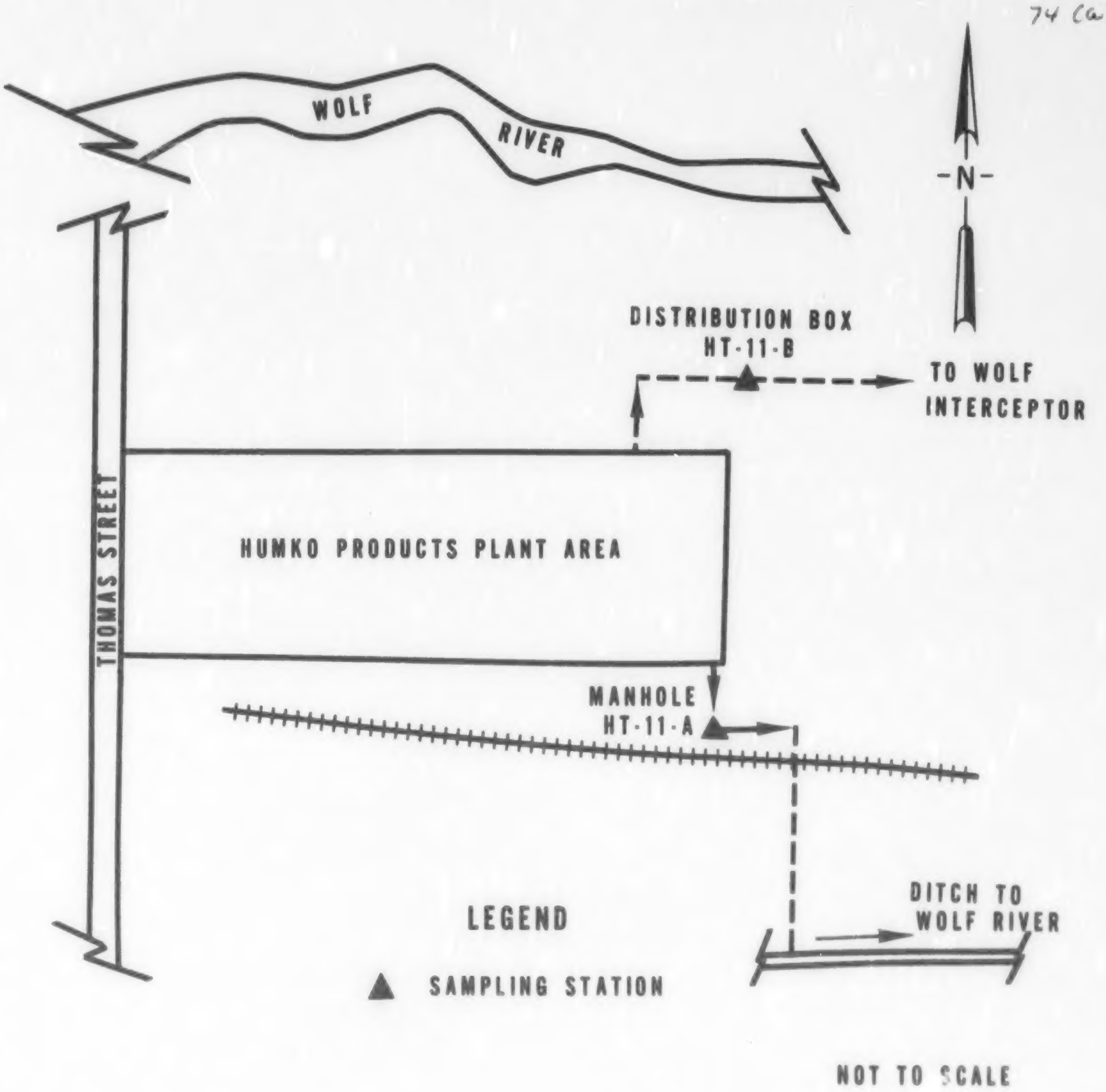


Figure HT-1 Humko Products Thomas Street Memphis, Tennessee
Sampling Stations HT-11-A, HT-11-B

was determined using the flow device located downstream from the air flotation unit. The flow from the second discharge (HT-11-A) was estimated by subtracting the flow at discharge HT-11-B from the total water intake.

A SERCO automatic sampler was used at each location, and, beginning on February 18 and ending February 21, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted into the appropriate containers for shipment and analyses. The samples requiring immediate analyses were transported to a mobile EPA laboratory in Memphis. The other samples were preserved and shipped by air freight to the NFIC-D (EPA) laboratory. Temperature, pH, and conductivity were measured twice daily on grab samples at each location. Also, grab samples were collected once daily for oil and grease analyses.

Discussion of Results

A summary of the analytical results from the HumKo (Thomas Street) plant is presented in Table HT-1. The data from sampling station HT-11-B indicate that HumKo (Thomas Street) is discharging a hot effluent (101-105 °F) with a pH range of 3.0-11.4 to the Wolf Interceptor. Average loads of 65,700 lb of BOD; 6,620 lb, TOC; 113,000 lb, COD; 43,500 lb, suspended solids; 47,000 lb, oil and grease; 10 lb, phenolic materials; 9.3 lb, copper; 24.1 lb, zinc; 100 lb, chromium; and 4.8 lb of lead per day were being discharged to the City interceptor and, subsequently, into the Mississippi River. Data from sampling station HT-11-A showed that HumKo was discharging an effluent containing 90,800 lb of BOD; 44,700 lb, TOC; 110,000 lb, COD; 53,400 lb, suspended solids; 62,000 lb, oil and grease; 26.1 lb, phenolic materials; 15.2 lb, zinc; 18.5 lb, chromium; and 12.2 lb lead per day to Cypress Creek which drains into the Wolf River.

TABLE HT-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
HUMKO PRODUCTS (THOMAS STREET)
February 18-21, 1972

Parameters[a/]	HT-11-A Range	HT-11-A Average	HT-11-A Load	HT-11-B Range	HT-11-B Average	HT-11-B lb/day
Flow (mgd)	1.15-1.34			4.62-5.41		
pH	2.6-9.9			3.0-11.4		
Temperature, °C	33.0-49.5			39.0-43.5		
Conductivity (umhos/cm)	1,000->8,000			500->8,000		
BOD	2,200-15,000	8,370	90,800	990-2,100	1,540[b/]	65,700
TOC	720-6,350	4,220	44,700	100-200	157	6,620
COD	4,820-24,100	16,400	110,000	730-4,680	2,670	113,000
Suspended Solids	128-8,400	5,040	53,400	101-1,600	1,030	43,500
Total Solids	5,650-58,100	32,200	330,000	4,420-9,700	6,370	165,000
Oil & Grease	170-15,000	5,800	62,000	370-2,000	1,100	47,000
Turbidity (JTU)	280-800	540		80-700	370	
Phenolic Materials	1.3-4.8	2.5	27	0.22-0.28	0.24	10
Cyanide	<0.02[c/]	<0.02		<0.02[c/]		
Copper	0.16-0.47	0.31	3.3	0.20-0.24	0.22	9.3
Cadmium	0.02-0.07	0.04	0.44	0.02-0.03	0.02	1.0
Zinc	0.24-2.5	1.45	15.2	0.46-0.75	0.57	24.1
Total Chromium	0.95-2.7	1.75	18.5	1.3-3.1	2.4	100
Mercury, µg/1	0.7-5.3	2.3	0.024	0.8-13.6	5.3	0.23
Lead	0.32-1.9	1.2	12.2	0.09-0.13	0.11	4.8

---

a/ All units are in mg/1 unless otherwise noted.
b/ Average of two numbers.
c/ Minimum detectable limit.

Article IV, Section 4(c), City of Memphis Ordinance No. 460 prohibits the discharge of an effluent having a pH less than 5.5. Section 5(j) prohibits the discharge of wastes having a pH greater than 9.5. The data [Table HT-1] indicate that the stream discharged to the City interceptor is violating this regulation. Section 5(b) prohibits a discharge containing oil and grease concentrations in excess of 100 mg/l. The HT-11-B discharge had an average oil and grease concentration of 1,100 mg/l. Section 5(e) prohibits the discharge of wastes containing, among other metals, copper, zinc, chromium and lead. Concentrations of these metals in the HumKo (Thomas Street) discharge were 0.22; 0.57; 2.4; and 0.11 mg/l respectively. This corresponds to 9.3 lb of copper; 24.1 lb, zinc; 100 lb, chromium; and 4.8 lb of lead.

The discharge, by the HumKo Products (Thomas Street) plant, of refuse (carbonaceous materials; oil and grease; suspended solids; copper; zinc: chromium; and lead) into the Mississippi River via the Wolf Interceptor without a permit from the U. S. Army Corps of Engineers, constitutes a violation of Section 407, Rivers and Harbors Act of 1899 (33 USC: 401-413).[2/]

D. SUMMARY & CONCLUSIONS

1. The HumKo Products (Thomas Street) plant discharges an effluent containing an average daily loading of 65,700 pounds of BOD; 6,620 pounds, TOC; 113,000 pounds, COD; 43,500 pounds, suspended solids; 47,000 pounds, oil & grease; 10 pounds, phenolic materials; 9.3 pounds, copper; 24.1 pounds, zinc; and 100 pounds of chromium to the Wolf Interceptor that discharges into the Mississippi River.

2. Lack of a municipal waste treatment system results in raw wastewater being discharged directly into the Mississippi River via the interceptor system.

3. Discharge of industrial wastes containing high biochemical oxygen demand, total organic carbon, chemical oxygen demand, suspended solids, oil and grease, and other pollutants into the Mississippi River without a permit from the U.S. Army Corps of Engineers is a violation of Section 407, Rivers and Harbors Act of 1899 (33 USC: 401-413).

4. High concentration of oil and grease, phenolic materials, and of chromium, and variations in pH violate sections of the Memphis City Ordinance on the Regulation of Sewer Use.

5. In addition, HumKo Products discharges an untreated effluent containing an average daily loading of 90,800 pounds of biochemical oxygen demand; 44,700 pounds of total organic carbon; 110,000 pounds of chemical oxygen demand; 53,400 pounds of suspended solids; 62,000 pounds of oil and grease; 27 pounds of phenolic materials; 15.2 pounds of zinc; 18.5 pounds of chromium; and 12.2 pounds of lead into Cypress Creek and thence into the Wolf River. This waste discharge also violates the Rivers and Harbors Act of 1899.

E. RECOMMENDATIONS

It is recommended that:

1. HumKo Products (Thomas Street) provide pollution control facilities, for the stream that discharges to the Wolf Interceptor (HT-11-B), in order to reduce biochemical oxygen demand, chemical oxygen demand, suspended solids, oil and grease, and toxic or hazardous materials to

the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	1,250
COD	100	4,100
Suspended Solids	30	1,250
Oil & Grease	5	210
Phenolic Materials	0.1	4.0
Chromium	0.1	4.0

2. HumKo Products (Thomas Street) provide pollution control facilities, for the stream that discharges to the Cypress Creek (HT-11-A), in order to reduce biochemical oxygen demand, chemical oxygen demand, suspended solids, oil and grease, and toxic or hazardous materials to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	305
COD	100	1,000
Suspended Solids	30	305
Oil & Grease	5	50
Phenolic Materials	0.20	2.0
Chromium	0.10	1.0

3. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

4. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 1 and 2.

5. Upon the failure of HumKo Products Chemical Division to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1, 2, and 3 appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

HUNT-WESSON FOODS
P. O. BOX 2674
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

Over the past three to four years the Hunt-Wesson (Memphis) plant has been under considerable pressure from the Tennessee Water Quality Control Board and from the Memphis and Shelby County Health Department to establish proper waste treatment and to cease gross pollution in Cane Creek. About two years ago the Company undertook a rather comprehensive engineering study intended to formulate alternative methods of reducing plant waste loads. Little action has been taken since then. The Tennessee Water Quality Control Board has recently ruled that Hunt-Wesson Foods must reduce its plant effluent BOD level to 20 mg/l or less; the Memphis and Shelby County Health Department is requesting that this maximum BOD be held between 5 and 10 mg/l.

Until approximately November of 1968, Hunt-Wesson was operating under a series of conditional waste discharge permits from the State of Tennessee. Although it was understood that a conditional State permit was granted to cover the period from May 1969 to May 1970, neither the Company nor the local health department officials ever received a copy of this permit statement from the State.

Plant wastes are still being discharged to Cane Creek [Figure HW-1] although arrangements have been made to connect the discharge to the Nonconnah Interceptor.

The Hunt-Wesson plant is a large, edible-oil refining complex. The

81 (a)

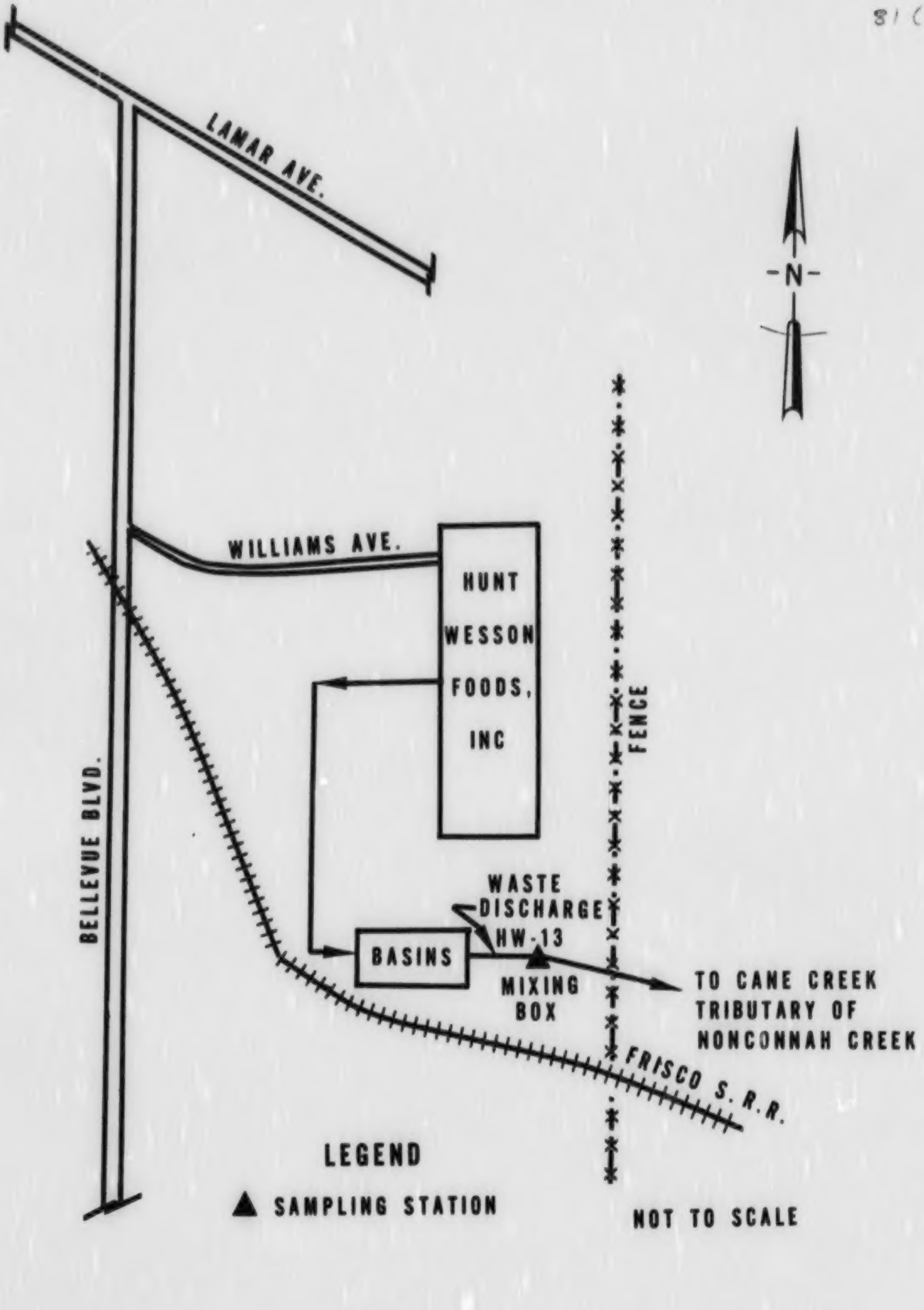


Figure HW-1 Hunt Wesson Foods, Inc. Memphis, Tennessee

Sampling Station HW-13

firm employs 225 persons and operates continously. The plant receives its water (approx. 2.3 mgd) almost entirely from wells. The total is divided as follows: 1.31 mgd for cooling purposes; 0.12 mgd for boiler feed; 0.79 mgd for process; and 0.01 mgd or less for sanitary purposes. None of the streams are recycled.

Under varying conditions the plant can make partially refined oils for the market, or receive partially refined oils and complete the process. Crude cottonseed and soybean oils are converted to edible vegetable oils and shortening products by means of caustic soda treatment; hydrogenation; steam distillation; bleaching; and deodorizing. The vacuum steam stripping process for deodorizing the vegetable oils is currently responsible for 75 percent of the BOD waste load and 25 percent of the waste volume from the Company refinery.

Chronology of Contacts

The Company was visited by E. J. Struzeski, Jr., Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D), EPA, on October 7, 1971. Hunt-Wesson Plant Manager D. C. VanSickle and Production Manager Robert Gunther conducted a tour of the facilities and explained the processes and wastewater treatment. George Harlow, Chief, Enforcement Branch, Region IV, EPA, wrote a letter [Appendix C], during January 1972, to Mr. Gunther advising him of the date of the investigation and requesting written permission to sample. This method was taken to advise Hunt-Wesson Foods that information provided as well as data regarding discharges from the Company premises may be used as evidence against the firm in abatement proceedings under the applicable laws. On February 3, 1972, Mr. Gunther, in reply to Mr. Harlow's letter, granted EPA written permission to sample.

On February 11, 1972, NFIC-D investigators W. C. Smith and E. Mann met with Messrs. Gunther and Wadley to make final arrangements for sampling.

B. WASTE SOURCES & TREATMENT

Process water, washings from the caustic soda treatment and filtration-absorption processes, and filter backwash are collected in a common drain that feeds into a "home-made" oil-grease separator equipped with provisions for continuous skimming [Figure HW-1]. Skimmings are reported to be returned to the plant for reprocessing. Detention time in the separator (8-ft water depth) is approximately 12 to 15 minutes. The separator effluent is then directed to a junction manhole. At this point the effluent combines with a relatively large, clear flow of wastewater judged to be cooling waters from the plant.

Hunt-Wesson has executed a contract with the City to connect the plant effluent into the Nonconnah Interceptor.

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

The Hunt-Wesson discharge was sampled on the plant property, where all waste streams combined in a mixing box [Station HW-13, Figure HW-1]. From February 18 to 21, 1972, a SERCO automatic sampler collected one sample every hour for three 24-hour periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. Then they were transported to a EPA mobile laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. Grab samples were taken twice daily in order to obtain temperature, pH, and conductivity and were collected once daily for oil and grease analyses.

Discussion of Results

The pH of the discharge varied from 2.0 to 7.1 [Table HW-1]. An effluent containing average daily loading of 998 lb of BOD; 5,740 lb, TOC; and 2,590 lb of COD was being discharged to Cane Creek. The concentration of oil and grease ranged from 7 to 34 mg/l; this value amounts to an average daily loading of 400 pounds.

The reach of Nonconnah Creek into which Cane Creek drains is classified by the State Board for fish and aquatic life. The strong pollutional load that Hunt-Wesson discharges into Cane Creek causes the receiving waters of Nonconnah Creek to deteriorate in quality.

Should Hunt-Wesson connect to the City Interceptor it would be necessary that pH be maintained between 5.5 and 9.5 as specified in Memphis Ordinance 468.

If Hunt-Wesson continues to discharge into Cane Creek the Company must build treatment facilities comparable to the best practicable control technology currently available and achieve effluent conditions of less than 20 mg/l each of BOD and suspended solids and less than 5 mg/l oil and grease.

TABLE HW-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
HUNT-WESSON FOODS
February 18-21, 1972

Parameters[a]	Range	Average	Load lb/day
Flow (mgd)		2.3	
pH	2.0-7.1		
Temperature, °C	25.5-39.0		
Conductivity, µmhos/cm	180-360		
BOD	26-100	52	998
TOC	226-374	299	5,740
COD	32-336	135	2,590
Suspended Solids	75-151	105	2,020
Total Solids	226-374	299	5,740
Oil & Grease	7-34	21	400
Total Kj-N	0.4-4.0	1.7	32.6
NH_3-N	<0.1[b]	<0.1[b]	
Org-N	0.4-4.0	1.7	32.6
NO_2, NO_3-N	<0.05[b]	<0.05[b]	
Total P	0.16-0.20	0.17	3.3
Turbidity, JTU	8-34	14	
Copper	<0.01[b]	<0.01[b]	
Cadmium	<0.01[b]	<0.01[b]	
Zinc	0.03-0.05	0.04	0.77
Total Chromium	<0.01[b]	<0.01[b]	
Lead	<0.03[b] -0.03	<0.03	

---

a/ All units are in mg/l unless otherwise noted.
b/ Minimum detectable limit.

D. SUMMARY & CONCLUSIONS

1. The Hunt-Wesson plant discharges an effluent containing an average daily loading of 998 pounds of BOD; 5,740 pounds, TOC; 2,590 pounds, COD; and 400 pounds of oil and grease into Cane Creek, which flows into Nonconnah Creek (a tributary of the Mississippi River).

2. Treatment of this discharge consists of a small oil-grease separator; it is not sufficient to provide adequate treatment of the wastewater being discharged into Cane Creek. This discharge violates the Rivers and Harbors Act of 1899.

3. The Company has failed to meet the 20 mg/1 BOD effluent limitation set by the Tennessee Water Quality Control Board or the 10 mg/1 effluent BOD level recommended by the Memphis and Shelby County Health Department. Although the Company has been under constant presure from City and State officials, in the past two years it has made few attempts to improve the wastewater treatment facilities.

E. RECOMMENDATIONS

It is recommended that:

1. If Hunt-Wesson continues to discharge to Cane Creek the Company must provide pollution control facilities to reduce the biochemical oxygen demand, chemical oxygen demand, suspended solids, and oil and grease to the levels attainable employing best practicable treatment.

These levels are:

Component	mg/l	lb/day
BOD	20	380
COD	60	1,520
Suspended Solids	20	380
Oil & Grease	5	90

3. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

3. If the Hunt-Wesson discharge is connected to the interceptor system the pH be maintained between 5.5-9.5.

4. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of the wastewater discharge to ensure compliance with Recommendation Numbers 1, 2 and 3.

5. Upon the failure of Hunt-Wesson Foods to provide a satisfactory documented commitment to comply with Recommendations 1, 2 or 3, appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

ICI AMERICA, INC.
1285 POPE STREET
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

ICI America, Inc. (formerly Atlas Chemical Company) is engaged in the production of food emulsifiers by a batch process. The plant receives vegetable oils, lard, tallow, and glycerin that are reacted, in the presence of a catalyst, to form mono-glycerides and edible oils. Other raw materials include sodium hydroxide, lime, and phosphoric acid.

The plant operates 2 shifts per day, 5 days per week and employs approximately 28 people.

Water used in this plant is provided by the City of Memphis.

Chronology of Contacts

On October 5, 1971, W. C. Smith, Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, EPA Baton Rouge Field Station; Bobby W. Fisher and Hugh Teaford, Memphis and Shelby County Health Department conducted a preliminary inspection of the ICI America plant. Mr. F. Zawicki, Plant Manager, was apprised of the purpose of the survey. He cooperated with the EPA and granted permission to sample the plant effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter confirming the date of the investigation and requesting written permission to sample. This method was taken to advise ICI America that information provided, and data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 1, 1972, S. A. LaRocca, Supervisor, Sanitary Engineering, in a reply to Mr. Harlow's letter, granted EPA permission to sample [Appendix C].

B. WASTE SOURCES AND TREATMENT

At the time of the survey a small grease skimmer was the only treatment for the discharge. The discharge flows from the grease skimmer into a ditch that carries the waste to Workhouse Bayou and then to the Wolf River. This waste will go to the City of Memphis interceptor system when the interceptor is completed.

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge to Workhouse Bayou (AC-20) was sampled on Company property just downstream from the grease skimmer [Figure ICI-1]. A SERCO automatic sampler was used, and, beginning on February 22 and ending February 25, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. Whenever possible the ICI America Company personnel were provided with a split sample. Grab samples were collected twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow was measured by EPA personnel and checked with Company water meter figures.

89 (a)

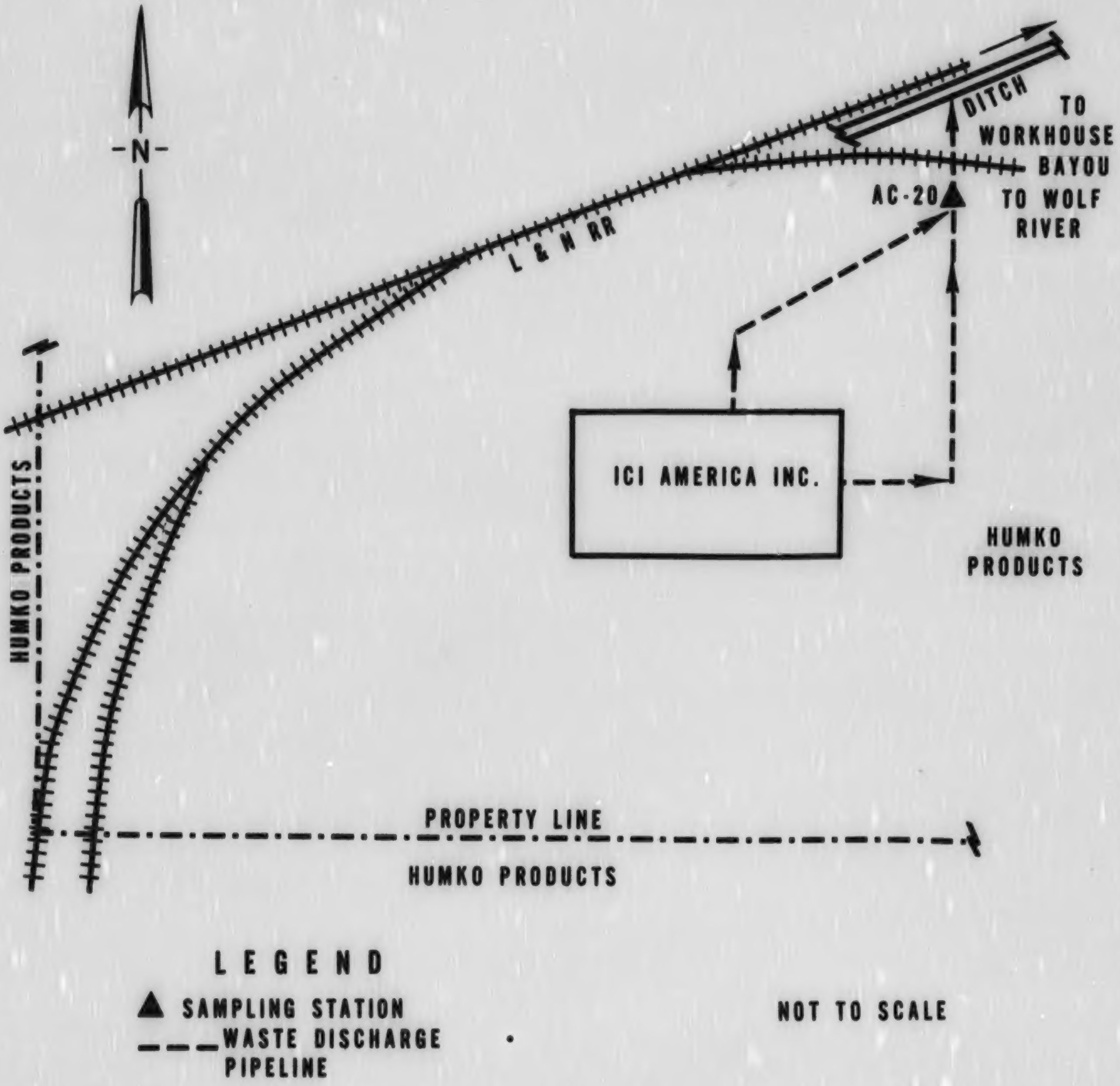


Figure ICI–1 ICI America Inc.Memphis, Tennessee
Sampling Station AC-20

Discussion of Results

The discharge from ICI America was highly carbonaceous, with concentrations of BOD, COD, and TOC of 470, 745, and 275 mg/l, respectively [Table ICI-1]. Because the flow rate was low (0.02-0.08 mgd) this effluent did not constitute a large discharge load. The oil and grease concentration was excessive, with values ranging from 50 to 290 mg/l. This situation indicates that the grease skimmer provided for the discharge stream cannot do an adequate job of removing the large quantity of oil and grease present.

There are many wastewater treatment practices available in current technology to adequately treat a highly carbonaceous stream also containing oil and grease. The low volume of flow and the near absence of toxic material make the discharge more amenable to treatment.

The reach of the Wolf River that receives the discharge from ICI America is classified by the Tennessee Water Quality Control Board for use for fish and aquatic life. The oil and grease discharged by ICI America mmay be detrimental to this use.

D. SUMMARY AND CONCLUSIONS

1. The discharge stream from ICI America contains average levels of 470 mg/l BOD; 275 mg/l TOC; 745 mg/l COD; and 140 mg/l oil and grease, and contributes an average load of 226 lb of BOD; 133 lb, TOC; 359 lb, COD; and 80 lb of oil and grease per day.

2. Because of the low flow rate the chemical and organic load to the Wolf River is not excessive; however, the treatment provided is not consistent with best practicable treatment.

TABLE ICI-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
ICI AMERICA, INC.
February 22-25, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd	0.02-0.08		
pH	6.9-7.5		
Temperature °C	22.0-43.0		
Conductivity, µmhos/cm	130-270		
BOD	340-560	470	226
TOC	220-310	275	133
COD	640-803	745	359
Suspended Solids	17-86	56	34
Total Solids	170-602	447	267
Oil & Grease	50-290	140	80
Turbidity, JTU	25-38	34	
Copper	0.01-0.03	0.02	
Cadmium	<0.01[b]	<0.01[b]	
Zinc	0.08-0.15	0.11	0.05
Total Chromium	<0.01[b]	<0.01[b]	
Lead	<0.03[b]-0.04	<0.04	

---

a/ All units are in mg/l except as noted.
b/ Minimum detectable value.

3. The grease skimmer provided by ICI America does not sufficiently treat oil and grease and the carbonaceous matter in its discharge.

4. ICI America, Inc., officials plan to connect the wastewater discharge to the City of Memphis interceptor system when it is completed.

E. RECOMMENDATIONS

It is recommended that:

1. ICI America, Inc. provide pollution control facilities for its discharge to reduce biochemical oxygen demand, chemical oxygen demand, suspended solids, and oil and grease to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	15
COD	100	50
Suspended Solids	30	15
Oil and Grease	5	2.5

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete Construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of the ICI America, Inc., discharge to ensure compliance with Recommendations 1 and 2.

INTERNATIONAL HARVESTER COMPANY
FARM EQUIPMENT DIVISION
3003 HARVESTER STREET
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The International Harvester Company plant at this location is a completely integrated farm machinery manufacturing facility. Starting with iron ingots as the raw material, this plant, through a series of operations, produces finished farm equipment. The various processes include: casting; shearing; bending; machining; welding; assembling; washing; plating; and painting of fabricated pieces. Water used in this plant is supplied by the City of Memphis.

Approximately 2,200 persons are employed at the plant that operates continuously, five days per week.

Chronology of Contacts

On October 5, 1971, W. C. Smith, Environmental Protection Agency (EPA) National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, Baton Rouge Field Station, EPA; Bobby W. Fisher and Hugh Teaford, Memphis and Shelby County Health Department, conducted a preliminary inspection of the International Harvester plant. R. E. McClure, Plant Manager, was apprised of the purpose of the survey. Mr. McClure cooperated with the EPA and granted permission to sample the plant effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. McClure [Appendix C], confirming the date of the investigation and requesting written permission to sample.

This means was taken to advise International Harvester that information provided, and data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 2, 1972, Mr. McClure, in reply to Mr. Harlow's letter, granted EPA permission to sample the Company's effluent [Appendix C].

B. WASTE SOURCES AND TREATMENT

The major process waste from this plant originates in the plating process. The main characteristics of this waste are excessive amounts of chronic acid, paint products, chromium, zinc, and oil and grease.

The chronic acid dragout, from the plating process, is passed over a limestone bed and then blended with alkali wastes designated for neutralization. Acid phosphate liquors that must be neutralized are blended with alkaline cleaners and effluents from the powerhouse. Excess spray paint is precipitated and coagulated by means of alkali additions. These wastes are all combined into a 72-in. pipe that empties into a ditch discharging to the Mississippi River.

An application for a permit to discharge has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge to the Mississippi River (IH-17) was sampled on Company property at a point downstream from where the 72-in. pipe empties into an open ditch [Figure IH-1]. A SERCO automatic sampler was used, and beginning on February 22 and ending February 25, 1972, a sample was collected

94(a)

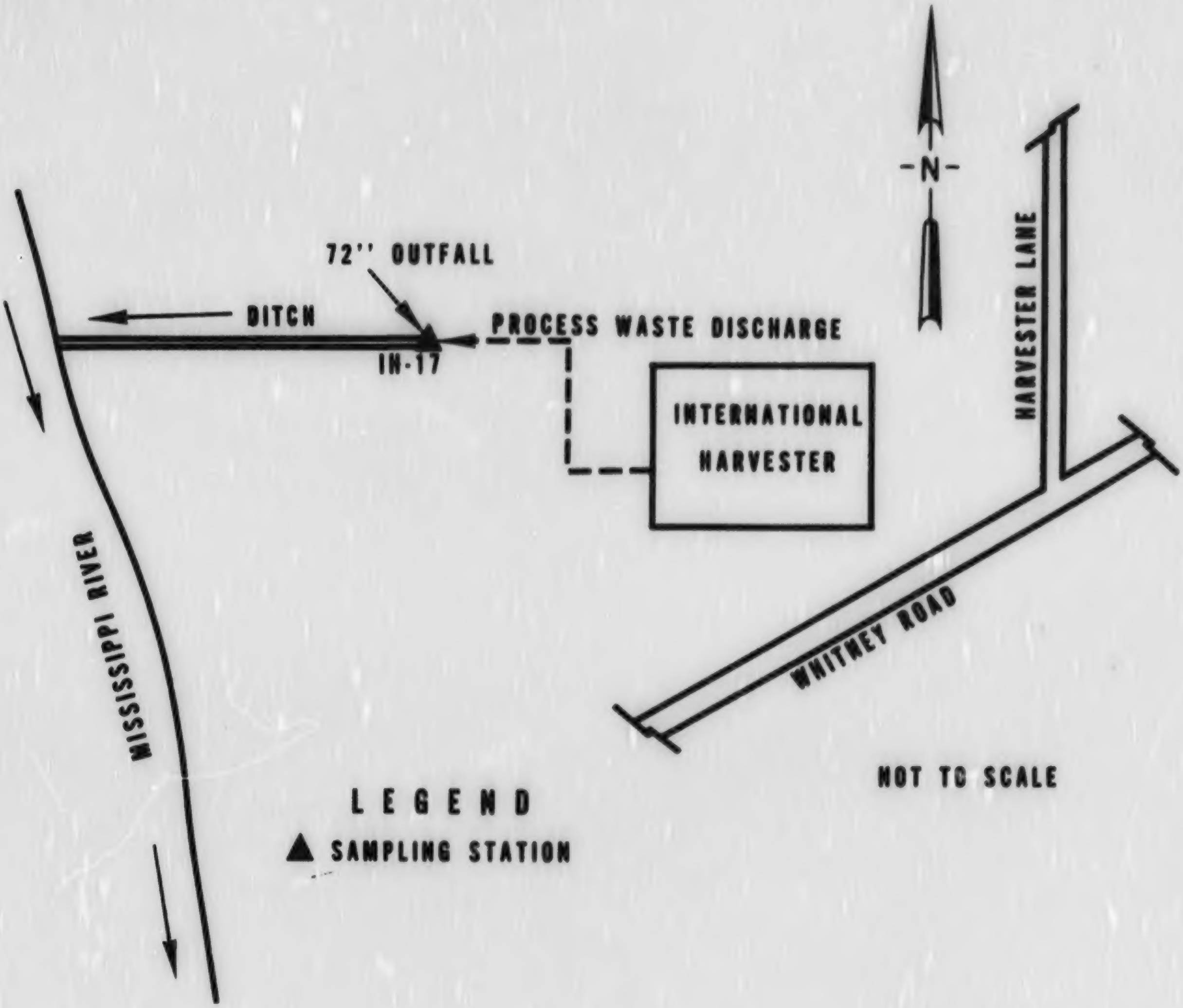


Figure IH-1 International Harvester Memphis, Tennessee
Sampling Station IH-17

every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D laboratories (EPA). Grab samples were taken twice daily in order to obtain temperature, pH, and conductivity measurements. Flow readings were taken from Company water-use meters.

Discussion of Results

The effluent discharged by International Harvester to the Mississippi River contained an average daily loading of 425 pounds of BOD; 5,300 pounds, TOC; and 1,680 pounds of COD.

In addition to having this chemical and organic loading, the effluent also contained 15.9 pounds of chromium and 9.2 pounds of lead. These figures correspond to average concentrations of 1.2 mg/l chromium and 0.7 mg/l lead. [A summary of these data is presented Table IH-1.]

The reach of the Mississippi receiving this discharge is classified by the Tennessee Water Quality Control Board for industrial use, fish and aquatic life, irrigation, recreation, livestock watering, wildlife, and navigation. Discharges containing loading such as those from International Harvester, and especially the heavy metals, violate the water quality criteria set forth by the State for these specific uses.

The treatment presently provided by International Harvester is not adequate to protect the quality of the receiving waters. An implementation schedule must be adopted for the timely abatement of this pollution source.

TABLE III-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
INTERNATIONAL HARVESTER COMPANY
February 22-25, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd	1.59-1.66		
pH	4.5-7.9		
Temperature, °C	20.5-22.0		
Conductivity, µmhos/cm	180-230		
BOD	21-39	31	425
TOC	314-437	387	5,300
COD	100-152	122	1,680
Suspended Solids	142-260	206	2,830
Total Solids	314-437	387	5,300
Turbidity, JTU	31-45	36	
Cyanide	<0.02[b]-0.03[c]	<0.02	
Copper	0.03-0.10	0.06	0.8
Cadmium	<0.01[b]	<0.01[b]	
Zinc	0.11-0.12	0.12	1.6
Total Chromium	0.5-1.6	1.2	15.9
Lead	0.3-1.2	0.7	9.2

---

[a] All units are in mg/l except as noted.

[b] Minimum detectable limit.

[c] Samples analyzed after maximum preservation time had expired.

D. SUMMARY AND CONCLUSIONS

1. The International Harvester Company discharges to the Mississippi an effluent containing an average daily load of 425 pounds of BOD; 5,300 pounds, TOC; 1,680 pounds, COD; 15.9 pounds, chromium; and 9.2 pounds of lead. The discharge of these toxic materials to the Mississippi River is a violation of the Rivers and Harbors Act of 1899.

2. International Harvester is not providing adequate treatment of wastewaters being discharged to the Mississippi River.

3. The presence of zinc and chromium and the pH fluctuation in the International Harvester discharge violate Federally approved water quality criteria established by the Tennessee Water Quality Control Board.

E. RECOMMENDATIONS

It is recommended that:

1. International Harvester provide pollution controls to reduce the loads discharged to the Mississippi River to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	400
COD	100	1,400
Suspended Solids	30	400
Oil and Grease	5	68
Zinc	0.1	1.3
Total Chromium	0.1	1.3

The pH be controlled and maintained between 6.0 and 9.0.

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.

- Meet treatment criteria outlined herein by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 1 and 2.

4. Upon the failure of the International Harvester Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2 appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

KIMBERLY-CLARK CORPORATION
MEMPHIS MILL
P. O. BOX 7066
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Kimberly-Clark Corporation manufactures a full line of paper products including facial tissue, toilet tissue, napkins, etc. The Company employs 1,560 people to operate the plant continuously. The plant has eight wells that provide an average of 7.34 mgd water, used as follows: 0.36 mgd for cooling-water; 0.04 mgd, boiler-feed; 6.9 mgd, process-water; 0.275 mgd, sanitary system; and 0.05 mgd for other needs.

Incoming pulps (bleached and unbleached) and some secondary fibers are beaten and re-pulped. The stock is passed through a "save-all" to partially recover fibers from the water medium. Fast dyes, tetrasodium pyrophosphate, sulfuric acid, animal glue, lime, talc, and various other agents are added to the stock in order to obtain certain properties. The material is subsequently directed to paper machines where the creped paper wadding is formed. The creped paper is then converted to the various paper products. Although different colored items are manufactured, the plant was making only white products during the survey.

Chronology of Contacts

On October 5, 1971, W. C. Smith, Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D); Joseph Alleman, Baton Rouge Field Station, EPA, and Bobby W. Fisher and Hugh Teaford, Memphis and Shelby County Health Department, visited the Kimberly-Clark

Corporation and discussed the Memphis Area Water Quality Survey. They spoke with Kimberly-Clark Plant Manager John Rezba, and Paul Schubert, who were at first hesitant to allow EPA to sample; but, after some discussion, permission was granted.

In January, 1972 George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter [Appendix C] to Mr. Rezba confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the Kimberly-Clark Corporation that information provided, and data regarding discharges from the company premises, may be used as evidence against the firm in abatement proceedings under the applicable laws. On February 3, 1972, in a reply letter to Mr. Harlow, Mr. Rezba granted EPA written permission to sample.

The Kimberly-Clark Corporation was again visited on February 15, 1972, by E. Mann of EPA, NFIC-D, and Mr. Fisher of the Memphis and Shelby County Health Department in order to make final arrangements for sampling.

B. WASTE SOURCES AND TREATMENT

There are two principal discharges from the Kimberly-Clark mill. The first consists of industrial wastes from the re-pulping process. The discharge is high in color, turbidity, BOD, COD, solids, and nitrogen. Data submitted to the Tennessee Water Quality Control Board [Table K-1] reveal that the average BOD level exceeds 100 mg/l and the suspended solids concentration is usually above 200 mg/l. When these concentrations are coupled with a flow ranging from 6-8 mgd, they constitute a sizable loading. The discharge is pumped through a 24-in. pipeline to the Wolf River [Figure K-1].

TABLE K-1

KIMBERLY-CLARK CORPORATION
DATA SUBMITTED TO THE
TENNESSEE WATER QUALITY CONTROL BOARD

Parameters[a]	Range	Average
September, 1971		
Flow (mgd)	5.8-7.9	6.9
Suspended Solids	129-359	208
BOD	120-128	124
October, 1971		
Flow (mgd)	6.0-7.9	6.8
Suspended Solids	137-417	257
BOD	91-151	11[illegible]
February, 1972		
Flow (mgd)	6.9-7.7	7.3
Suspended Solids	225-411	287
BOD	203-231	219

---

[a] All units are in mg/l unless otherwise noted.

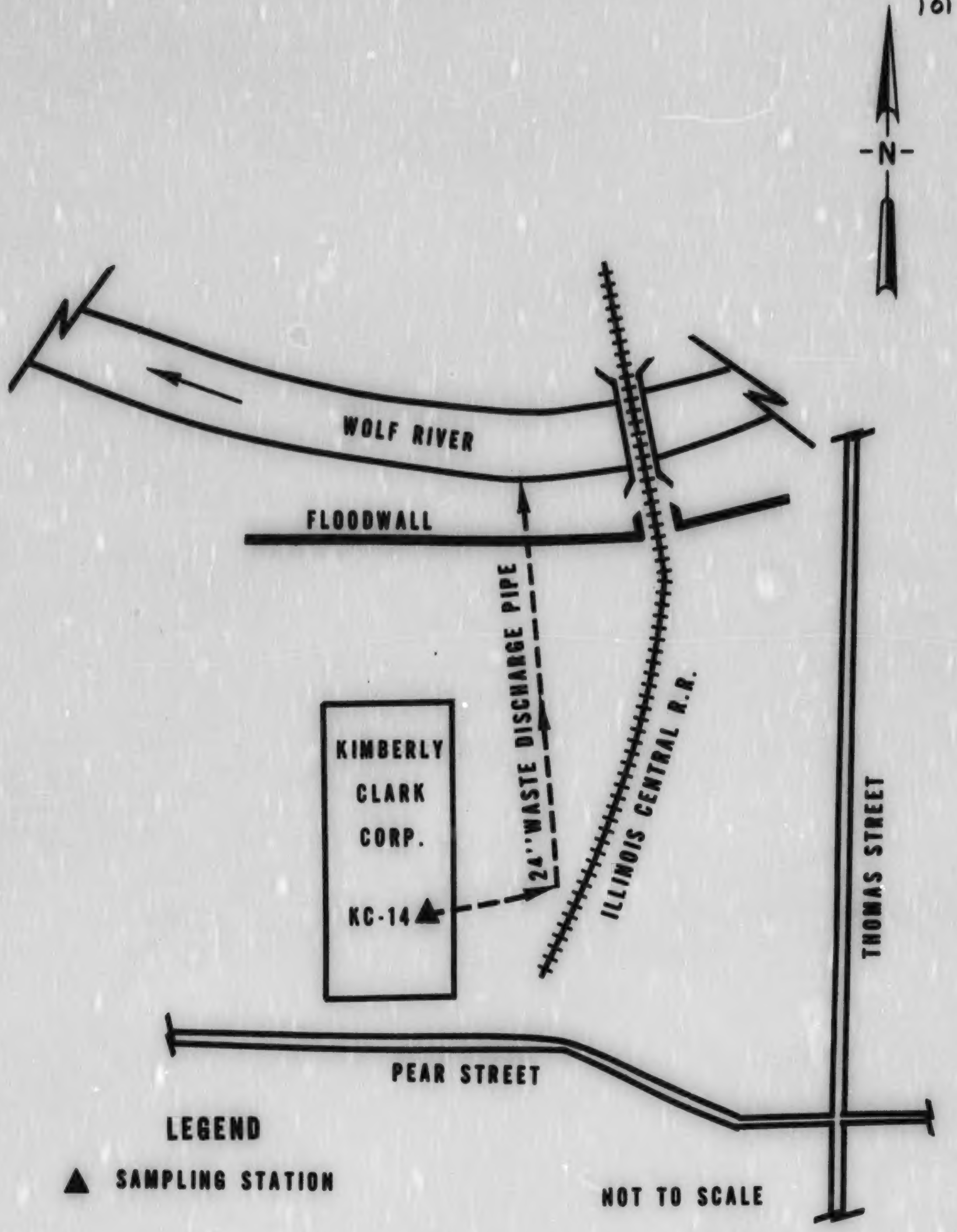


Figure K–1 Kimberly Clark Corp.Memphis ,Tennessee
Sampling Station KC-14

There is no treatment of the wastewater discharged to the Wolf River. However, the Company employs certain in-plant measures to reduce the waste load entering the water. The waste stream is filtered over a "save-all" to recover fiber before discharge; water from the tissue machines is recycled; process-water containing fibers is segregated from other waste streams; and the chemical used to obtain wet strength in the product has been changed, thereby reducing the amount of phosphate required.

The second discharge consists of backwash from the intake water treatment system, in which iron is removed from the well-water by means of the Walker Process. This effluent comprises 14 percent of the waste-water and is discharged directly into the Wolf River. An application for a permit to discharge both streams has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

From February 18 to 21, 1972, the process-water discharge from the Kimberly-Clark Corporation was sampled inside the plant at a point where the Company took samples for its own analyses. Their automatic sampler took two aliquots every 35 seconds and composited them in a large container for an 8-hr period. At the end of each 8-hr period, Company personnel took a 1-gallon sample and preserved it on ice. After 24 hours, EPA personnel picked up the three 1-gallon samples, composited them, and aliquoted them to the appropriate containers for shipment and analyses. Samples requiring immediate analyses were transported to a mobile EPA laboratory in Memphis. The remainder were preserved and shipped by air freight to the NFIC-D (EPA) laboratories. Readings for temperature, pH, and conductivity were taken daily. Grab samples were taken once daily for oil and grease analyses.

Discussion of Results

The BOD, TOC, and COD levels averaged 77, 209, and 411 mg/l, respectively [Table K-2]. Because the measured flow ranged between 7.35 and 7.80 mgd, this amounted to a daily average loading of 4,780 pounds of BOD; 13,100 pounds, TOC; and 25,900 pounds of COD being discharged into the Wolf River. In addition, the wastewater stream carried 12,700 pounds of suspended solids, 39,100 pounds of total solids, and 1,800 pounds of oil and grease per day. The reach of the Wolf River receiving the discharge from Kimberly-Clark is classified, by the Tennessee Water Quality Control Board, for use as a habitat for fish and aquatic life. The high organic, chemical, solids, and oil and grease levels can be detrimental to fish and aquatic life and constitute a violation of these Water Quality Criteria.

Company officials plan to connect the wastewater discharge to the City of Memphis interceptor system. The large volume of water combined with the concentrations of pollutants will cause a considerable loading on the river. The Company should take measures to treat the effluent in such a manner that the bulk of the water could be recycled within the plant.

D. SUMMARY AND CONCLUSIONS

1. The Kimberly-Clark Corporation discharges an effluent containing 4,780 pounds of BOD; 13,100 pounds, TOC; 25,900 pounds, COD; 12,700 pounds,

TABLE K-2

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
KIMBERLY-CLARK CORPORATION
February 18-21, 1972

Parameters[a]	Range	Average	Load lb/day
Flow (mgd)	7.35-7.80		
pH	7.0-7.9		
Temperature, °C	25.5-26.5		
Conductivity, µmhos/cm	360-600		
BOD	18-140	77	4,780
TOC	158-250	209	13,100
COD	340-451	411	25,900
Suspended Solids	40-490	197	12,700
Total Solids	375-788	622	39,100
Oil and Grease	14-49	28	1,800
Turbidity, JTU	38-180	103	
Copper	0.04	0.04	2.5
Cadmium	<0.01[b]	<0.01[b]	
Zinc	0.04-0.60	0.23	14.3
Total Chromium	<0.01[b]-0.01	<0.01	
Lead	<0.03[b]-0.10	0.05	3.4

---

[a] All units are in mg/l unless otherwise noted.
[b] Minimum detectable limit.

suspended solids; 39,100 pounds, total solids; and 1,800 pounds of oil and grease per day into the Wolf River.

2. The Kimberly-Clark Corporation has taken certain in-plant measures to control pollution. These measures are not sufficient to reduce the load being discharged to the Wolf River. There is no treatment of the effluent stream. This discharge is a violation of the Rivers and Harbors Act of 1899.

3. An application for a permit to discharge the two wastewater streams has been filed with the U. S. Army Corps of Engineers.

E. RECOMMENDATIONS

It is recommended that:

1. Kimberly-Clark Corporation employ improved in-plant controls to reduce the amount of water used.

2. Kimberly-Clark provide pollution abatement facilities in order to reduce the load of pollutants to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	1,600
COD	100	5,280
Suspended Solids	30	1,600
Oil and Grease	5	270

3. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

4. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with Recommendations Numbers 2 and 3.

5, Upon the failure of the Kimberly-Clark Corporation to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1, 2, and 3 appropriate abatement proceedings be initiated under the Rivers and Harbors Act of 1899.

NAVAL AIR STATION MEMPHIS (84)
MILLINGTON, TENNESSEE

A. BACKGROUND INFORMATION

General

The Naval Air Station Memphis (84) provides basic training in aircraft maintenance. Domestic wastes from the Air Station are treated by a secondary treatment system. This system serves a total population of 8,000-10,000 people.

All water used on the Station is provided by deep wells.

Chronology of Contacts

On January 18, 1972, W. C. Smith and G. A. Stone, Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D) conducted a preliminary inspection of the Naval Air Station. E. O. Miller, Manager, Utilities, was apprised of the purpose of the survey. Mr. Miller cooperated with the EPA representatives and granted permission to sample the treatment plant effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Miller [Appendix C] confirming the date of the investigation and requesting written permission to sample. This method was taken to advise Naval Air Station Memphis (84) that information provided, and data regarding discharges from the premises of the Naval Air Station may be used as evidence against the facility in abatement proceedings under the applicable laws.

On February 4, 1972, Commander Houghton of the Naval Air Station Memphis (84), in reply to Mr. Harlow, granted permission to sample [Appendix C].

B. WASTE SOURCES AND TREATMENT

The primary sources of waste at Naval Air Station Memphis (84) are domestic wastes and wash-down from the aircraft maintenance area.

The treatment system is a secondary biological system consisting of four Imhoff tanks, two trickling filters, four final settling tanks, and a chlorine chamber [Figure M-1].

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge to Big Creek (M-7) was sampled on Naval Air Station property at a position immediately downstream from the secondary clarifiers [Figure M-1]. A SERCO automatic sampler was used, and, beginning on February 18 and terminating on February 21, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D (EPA) laboratories. Grab samples were collected twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow readings were taken from the Naval Air Station flow meters.

Discussion of Results

At the time of the survey the discharge from the Naval Air Station was flowing at the rate of 2.2 mgd. Average concentrations of 18 mg/l BOD, 25 mg/l TOC, 45 mg/l COD, 57 mg/l suspended solids, and 21 mg/l oil and grease were found [Table M-1]. Operation procedures should be

108 (a)

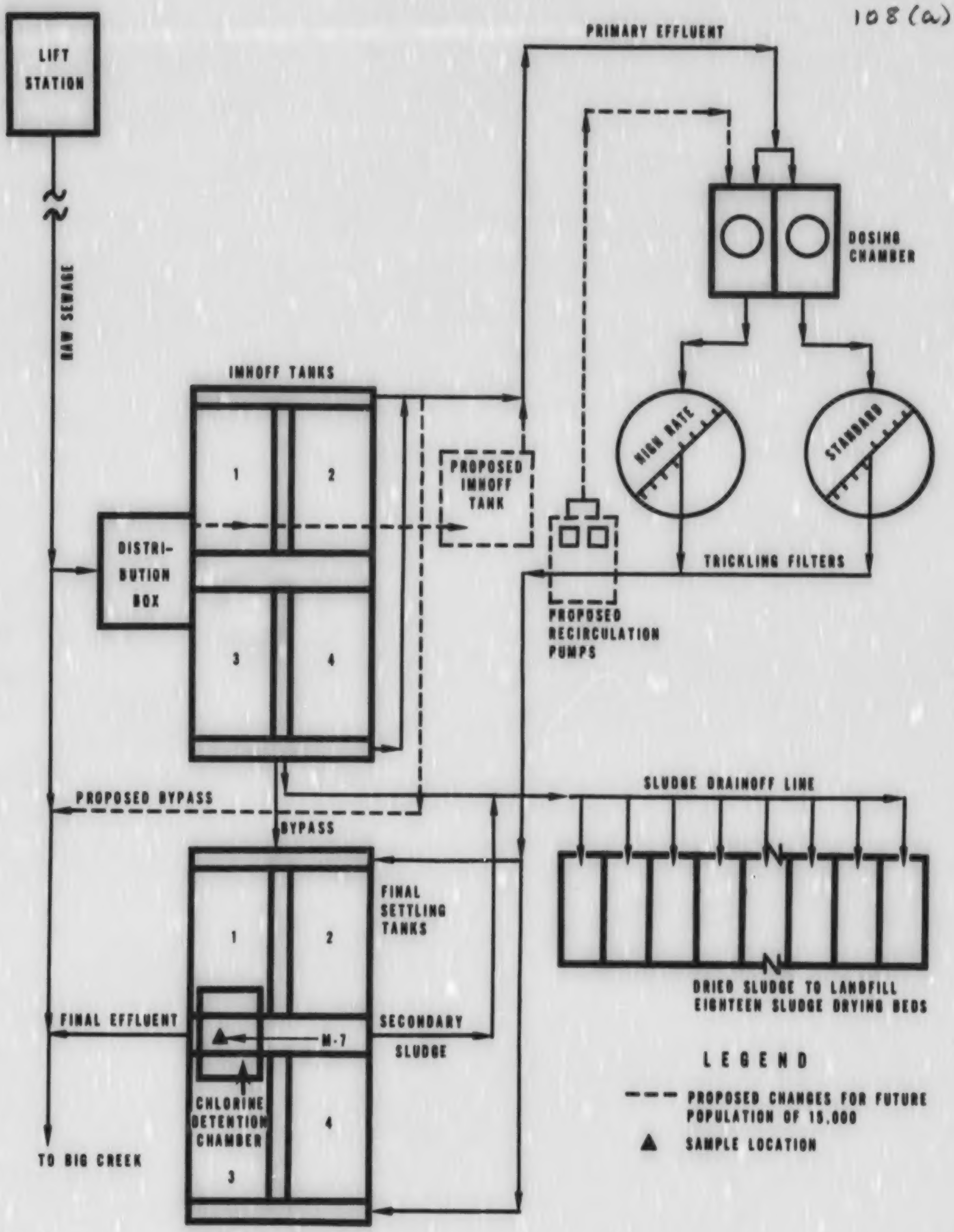


Figure M-1 Naval Air Station Memphis (84) Millington, Tennessee Wastewater Treatment System

TABLE M-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
NAVAL AIR STATION MEMPHIS (84)
February 18-22, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd		2.2	
pH	6.9-7.1		
Temperature, °C	12-17		
Conductivity, µmhos/cm	550-660		
BOD	16-20	18	330
TOC	19-35	25	460
COD	44-46	45	830
Suspended Solids	45-65	57	1,050
Total Solids	329-523	431	7,910
Oil and Grease	8-45	21	390
Total Kj-N	7.2-12.0	9.1	170
N as NH_3	4.4-9.2	6.4	120
Organic N	2.5-2.8	2.7	50
N as NO_3-NO_2	<0.05[b]	<0.05[b]	
Total Phosphorus	9.8-14.8	12.8	240
Turbidity, JTU	7-10	8	
Copper	0.03-0.04	0.03	0.6
Cadmium	<0.01		
Zinc	0.07-0.09	0.08	1.47
Total Chromium	<0.01-0.03	<0.02	0.4
Lead	0.07-0.1	0.08	1.47

---

[a] All units are in mg/l unless otherwise noted.
[b] Minimum detectable limit.

practiced so that the suspended solids level is less than 30 mg/l and the oil and grease concentration is maintained below 5 mg/l. The nutrient concentration was not excessive; the total nitrogen and total phosphorus concentrations averaged 9.1 and 12.8 mg/l, respectively. Heavy metals were present only in trace amounts.

D. SUMMARY AND CONCLUSIONS

1. The Naval Air Station Memphis (84) provides secondary treatment for its wastewater before discharging it to Big Creek.

2. The effluent from the wastewater treatment plant contains average levels of 18 mg/l BOD, 25 mg/l TOC, 45 mg/l COD, 57 mg/l suspended solids, and 21 mg/l oil and grease. The nutrient level and heavy metals concentration were not excessive.

E. RECOMMENDATIONS

1. It is recommended that the Naval Air Station Memphis (84) control the quality of the effluent in order to maintain biochemical oxygen demand and suspended solids concentrations below 30 mg/l, oil and grease levels below 5 mg/l, and toxic materials and heavy metals in trace amounts.

CITY OF MILLINGTON WASTEWATER TREATMENT PLANT
MILLINGTON, TENNESSEE

A. BACKGROUND INFORMATION

General

The sewage treatment plant is a secondary system designed to treat the domestic waste for the City of Millington. There are no major industries that discharge into this system.

Past records, for February 2-4, 1971, indicate that BOD removal efficiencies averaged about 62% and suspended solids removal efficiencies averaged around 73%. These removal efficiencies do not reflect adequate operation of a secondary treatment plant.

Chronology of Contacts

On January 18, 1972, W. C. Smith and G. A. Stone, Environmental Protection Agency (EPA) National Field Investigations Center-Denver (NFIC-D), conducted a preliminary inspection of the municipal sewage treatment plant. City of Millington Water Superintendent John Clement was apprised of the purpose of the survey. Mr. Clement cooperated with the EPA personnel and granted permission to sample the plant effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Clement [Appendix C], confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the City of Millington that information provided, as well as data regarding discharges from the premises of the municipality, may be used as evidence against the City in abatement proceedings under the applicable laws.

On February 2, 1972, Mr. Clement, in reply to Mr. Harlow's letter, granted permission to sample [Appendix C].

B. WASTE SOURCES AND TREATMENT

The domestic waste to be treated by this plant originates from the City of Millington (population 10,000).

The existing secondary wastewater treatment plant, designed for 2.0 mgd, consists of the following [Figure CM-1]: grit removal, comminutor, primary clarifiers (2), trickling filters (2), final clarifiers (2), chlorine chamber and two anaerobic digesters. One digester is cracked and does not operate properly.

Effluent from this plant is discharged to Big Creek and then to the Loosahatchie River.

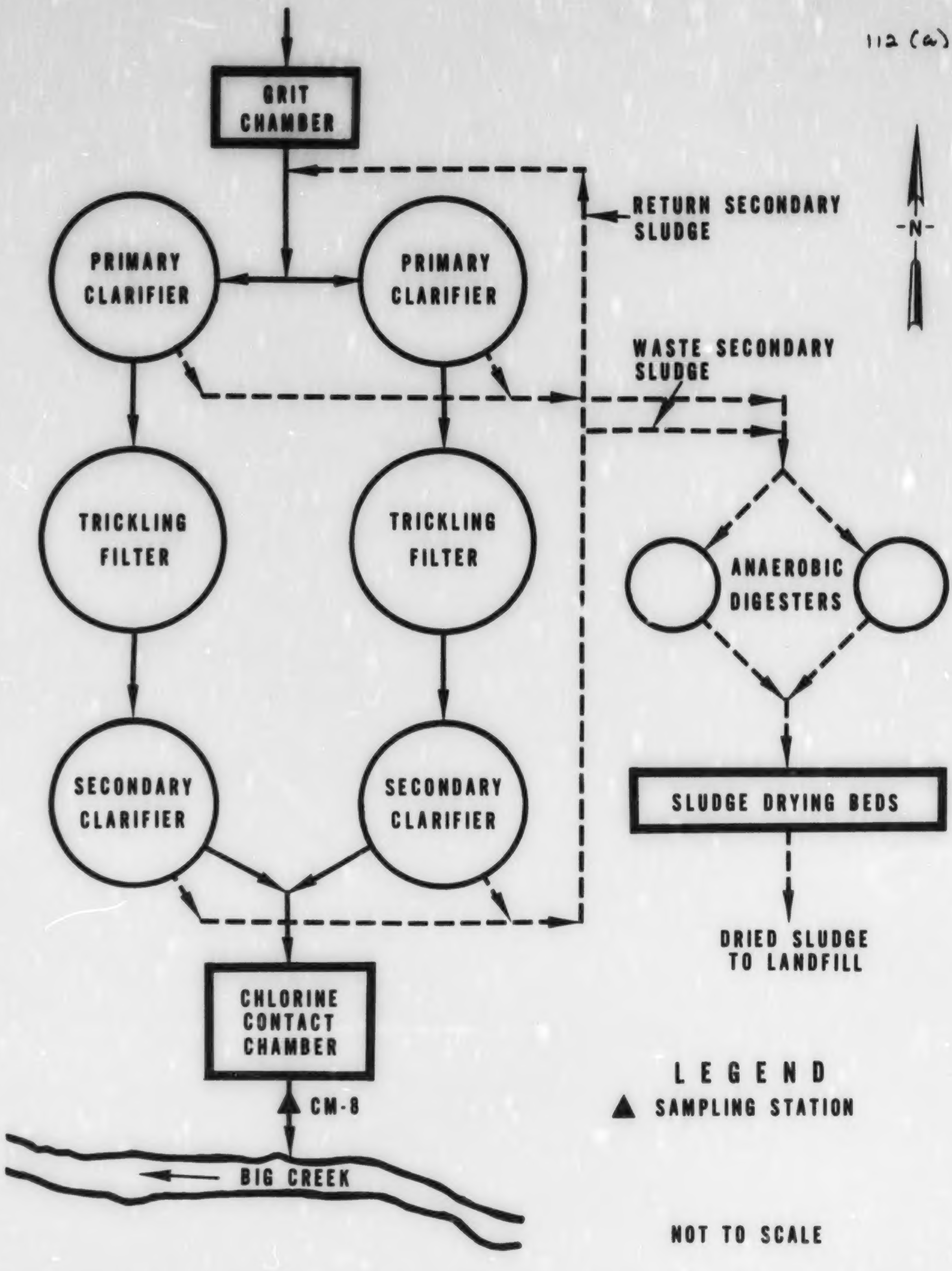
The City of Millington plans to connect to the City of Memphis interceptor system when the North Treatment Plant is constructed and operative.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge into Big Creek (CM-8) was sampled on the City property immediately downstream from the chlorine chamber [Figure CM-1]. A SERCO automatic sampler was used, and, beginning on February 18 and ending February 21, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted into the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express

112 (a)



igure CM–1 City of Millington Wastewater Treatment Plant, Millington, Tennessee
Sample Station CM-8

to the NFIC-D (EPA) laboratories. Grab samples were collected twice daily in order to obtain temperature, pH, and conductivity and once daily for oil and grease analyses. Flow readings were taken from City flow meters.

Discussion of Results

The effluent from the municipal waste treatment plant ranged from 0.65 to 1.0 mgd. The plant discharged an average daily loading of 363 pounds of BOD; 452 pounds, TOC; 845 pounds, COD; and 454 pounds of suspended solids [Table CM-1]. These values correspond to average concentrations of 50, 62, 116, and 64 mg/l, respectively. Effluent concentrations of less than 30 mg/l for BOD and suspended solids should be achieved. The oil and grease concentration averaged 16 mg/l; this concentration should be kept below 5 mg/l. The nutrient level was moderate, having average concentrations of 19 mg/l total nitrogen and 14 mg/l total phosphorus. The heavy metal concentration is low [Table CM-1].

At the time of the survey, the volume of wastewater being treated was below the average design flow. The facilities are designed to be adequate for handling the wastewater, and measures should, therefore, be taken to operate the system more efficiently.

D. SUMMARY AND CONCLUSIONS

1. The effluent from the Millington Wastewater Treatment Plant contains average concentrations of 50 mg/l BOD, 62 mg/l TOC, 116 mg/l COD, 64 mg/l suspended solids, 16 mg/l oil and grease, 19 mg/l total nitrogen, and 14 mg/l total phosphorus.

TABLE CM-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
CITY OF MILLINGTON WASTEWATER TREATMENT PLANT
February 18-21, 1972

Parameter[a]	Range	Average	Load lb/day
Flow, mgd	0.65-1.0		
pH	6.8-7.4		
Temperature, °C	9-14.5		
Conductivity, µmhos/cm	700-750		
BOD	32-69	50	363
TOC	52-78	62	452
COD	107-123	116	845
Suspended Solids	23-120	64	454
Total Solids	434-764	613	4,460
Oil & Grease	14-19	16	120
Total Kj-N	18-20	19	141
N as NH_3	12-14	13	92
Organic N	6-8	7	49
N as NO_3-NO_2	<0.05[b]		
Total Phosphorus	11.4-17.7	14	103
Turbidity, JTU	18-23	21	
Copper		0.02	0.15
Cadmium	<0.01		
Zinc	0.04-0.08	0.07	0.48
Total Chromium	<0.01[b]-0.02	0.01	0.1
Lead	<0.03-0.04		0.3

---

[a] All units are in mg/l except as noted.

[b] Minimum detectable limit.

2. The plant was operating below the average design flow.

D. RECOMMENDATIONS

It is recommended that:

1. The City of Millington Wastewater Treatment Plant exercise better operational procedures to improve removal efficiencies.

2. The BOD and the suspended solids concentration in the effluent be kept below 30 mg/1; the oil and grease level should be maintained under 5 mg/1.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of the effluent to ensure compliance with Recommendations 1 and 2.

THE QUAKER OATS COMPANY
P. O. BOX 8035
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Quaker Oats Company is a major producer of furfural. Corncobs, rice hulls, cottonseed hulls, and wood chips are reacted, over a catalyst, with sulfuric acid in an autoclave. Furfural is recovered from the vapors, and a portion of it may be converted to furfural alcohol, furan, tetrahydrofuran, and poly-tetra-methylene-ether-glycol. The ligno-cellulose residues are dried and recovered as salable by-products.

Approximately 550 tons of raw materials are employed to produce 62 tons of end products per day. Four Company wells supply 3 mgd of water that is used for cooling, boiler feed, and processing. City of Memphis water (0.02 mgd) is used for the sanitary system.

The Company employs 215 people to operate the plant continuously.

Chronology of Contacts

On October 7, 1971, E. J. Struzeski, Jr. of the Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D) met with Technical Department Manager L. A. Grosmaire and Plant Manager R. K. Fincher. At that time they gave the EPA representative a tour of the plant and explained the operations. Messrs. Grosmaire and Fincher were, at the same time, informed of the approaching investigation.

In January, 1972, George Harlow, Chief, Enforcement Branch, EPA Region IV, wrote a letter to Mr. Fincher confirming the date of the investigation and requesting written permission to sample. This means was taken to advise The Quaker Oaks Company that information provided and data regarding discharges from the premises may be used as evidence against the firm in abatement proceedings under the applicable laws. On February 4, 1972, Mr. Fincher, in replying to Mr. Harlow's letter, granted EPA personnel permission [Appendix C] to sample in the plant area of The Quaker Oats Company.

The plant was re-visited (February 15), and arrangements were made for sampling.

B. WASTE SOURCES & TREATMENT

The Company has two wastewater streams. The first consists of strong process wastes (0.9 mgd) and sanitary sewage (0.1 mgd) that are discharged without treatment to the City interceptor [Figure O-1]. The firm has recently taken measures to segregate these strong wastes into a separate stream. The second waste stream, containing approximately 2 mgd of cooling water with dissolved salts, filter backwash, and boiler ash, is discharged through the main plant drainage ditch to the Wolf River. Ash residue from the power plant is slurried to a 50 x 350 ft ash settling pond located at the rear of the plant property. Sediment is removed from the pond about once a year. Detention time varies from 50 minutes to a few hours and the overflow enters the main plant drainage ditch which in turn leads to the Wolf River via a series of lakelets (abandoned gravel pits).

Analysis of the wastewater discharged to the Wolf River [Table O-1] is submitted monthly to the Tennessee Water Quality Control Board. The data for September and October (1971) revealed that the chemical and

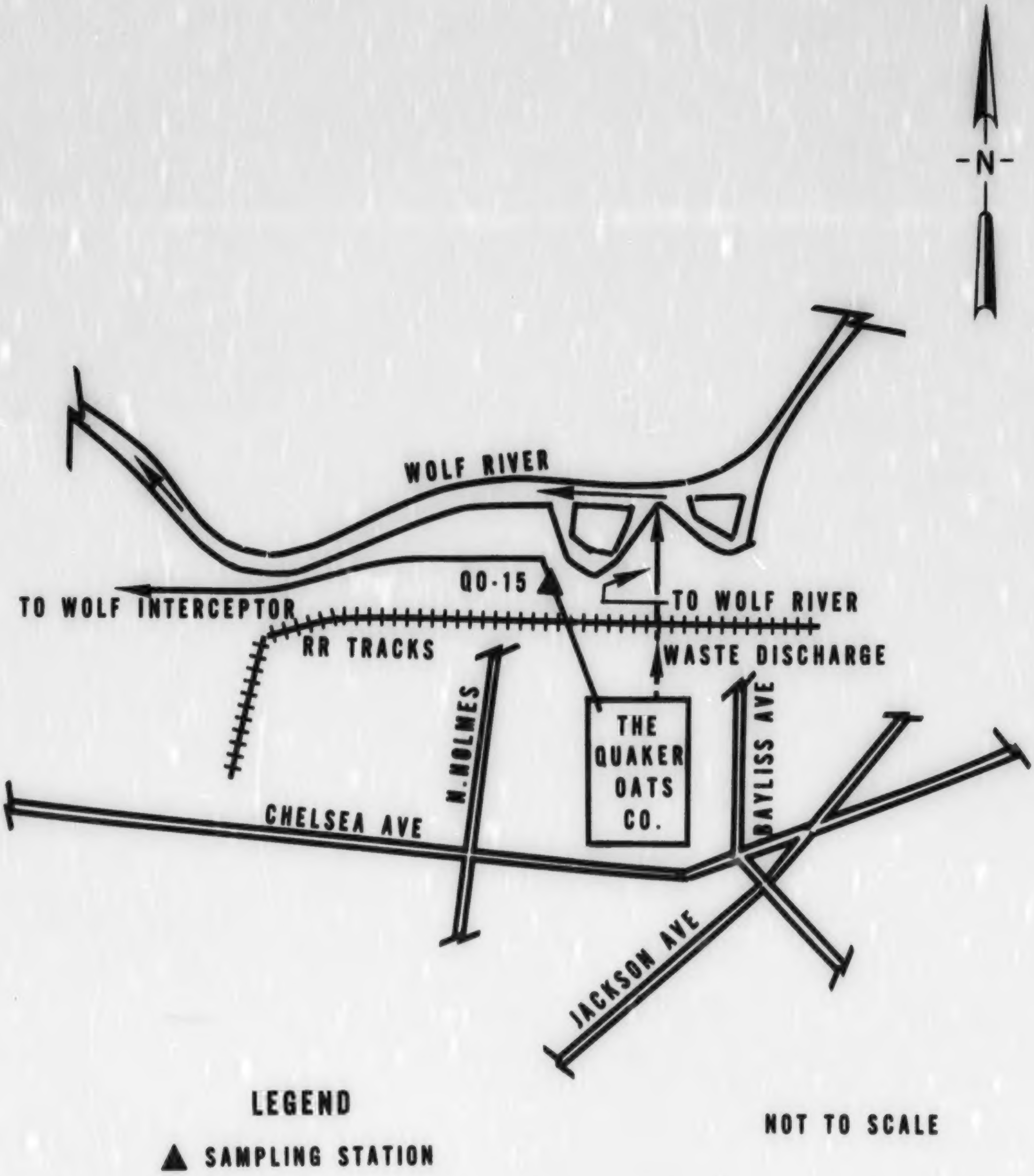


Figure Q-1 The Quaker Oats Company Memphis, Tennessee
Sampling Station QO-15

TABLE Q-1

ANALYSES OF THE QUAKER OATS DISCHARGE TO THE WOLF RIVER SUBMITTED TO THE TENNESSEE WATER QUALITY CONTROL BOARD

	Range	Average
September, 1971		
pH	7.6-10.9	
Temp. °F	72-94	
BOD, mg/1	3-17	17
COD, mg/1	26-37	30
Flow, mgd	1.3-3.5	2.4
October, 1971		
pH	8.2-10.0	
Temp. °F	72-92	
BOD, mg/1	2-47	18
COD, mg/1	25-43	32
Flow, mgd	1.0-2.5	1.66
February, 1972		
pH	2.35-9.84	
Temp. °F	65-86	
BOD, mg/1	12-74	34
COD, mg/1	7-47	21
Flow, mgd	1.95-3.1	2.6

TABLE Q-1

ANALYSES OF THE QUAKER OATS DISCHARGE TO THE WOLF RIVER SUBMITTED TO THE TENNESSEE WATER QUALITY CONTROL BOARD

	Range	Average
September, 1971		
pH	7.6-10.9	
Temp. °F	72-94	
BOD, mg/1	3-17	17
COD, mg/1	26-37	30
Flow, mgd	1.3-3.5	2.4
October, 1971		
pH	8.2-10.0	
Temp. °F	72-98	
BOD, mg/1	2-47	18
COD, mg/1	25-43	32
Flow, mgd	1.0-2.5	1.66
February, 1972		
pH	2.35-9.84	
Temp. °F	65-86	
BOD, mg/1	12-74	34
COD, mg/1	7-47	21
Flow, mgd	1.95-3.1	2.6

organic pollution was low; the BOD and COD averaged approximately 18 and 31 mg/l, respectively. (Analyses made during February 1972 [Table Q-1] indicate that this stream was not grossly polluted.)

For the discharge to the Wolf River via Cypress Creek, the Quaker Oats Company has applied to the U. S. Army Corps of Engineers for a permit.

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

The discharge to the Wolf Interceptor was sampled, on Company property, in a manhole where the various waste streams are combined [Figure Q-1]. A SERCO automatic sampler was lowered into the manhole, and, beginning on February 18 and ending February 21, 1972, a sample was collected every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted into the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to the NFIC-D laboratories (EPA). Whenever possible, a split sample was provided for The Quaker Oats Company personnel. Grab samples were taken twice daily in order to obtain temperature, pH, and conductivity and once per day for oil and grease analyses. Flow readings were taken from Company flow meters.

Discussion of Results

The hot effluent (140-145° F) had a pH range from 4.8 to 7.4 and contained average loads of 29,000 lb of BOD, 25,400 lb, TOC; and 54,000 lb of COD that were being discharged to the Mississippi River via Wolf Interceptor.

These values correspond to concentrations of 3,970, 3,480, and 7,590 mg/l, respectively. [A summary of the analytical results of The Quaker Oats Company discharge to the Wolf Interceptor is shown in Table Q-2.] The total and suspended solids loadings averaged 88,100 and 17,000 lb/day, respectively.

Article IV, Section 4(c), City of Memphis Ordinance No. 460 prohibits the discharge of wastes having a pH less than 5.5. Section 5(a) prohibits the discharge of a liquid having a temperature higher than 150°F. The temperature of the Company discharge is under this limit; care must be taken to avoid exceeding it. Section 5(h) prohibits the discharge of materials that exert unusual BOD and COD demands such as those listed above.

The reach of the Mississippi River that receives the discharge from the Wolf Interceptor is classified by the Tennessee Water Quality Control Board for industrial uses; fish and aquatic life; irrigation; livestock watering; wildlife; and navigation. Under the criteria established by the State, pollutants that will be detrimental to any one of these uses or that will produce toxic conditions shall not be added to the waters. The presence of PCB Arclor 1248 (22 μg/l) can be harmful to fish and aquatic life.

Even though the Wolf Interceptor will eventually go to a wastewater treatment plant, pretreatment of the wastewater must be provided by The Quaker Oats Company in order to reduce the magnitude of the load as well as to decrease the concentration of non-biodegradable material.

TABLE Q-2

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
THE QUAKER OATS COMPANY DISCHARGE TO WOLF INTERCEPTOR
FEBRUARY 18-21, 1972

Parameters[a]	Range	Average	Load lb/day
Flow, mgd	0.764-0.982		
pH	4.8-7.4		
Temperature, °F	140-145		
Conductivity, µmhos/cm	6,000-8,250		
BOD	3,100-5,600	3,970	29,000
TOC	1,800-4,830	3,480	25,400
COD	4,820-9,400	7,590	54,000
Suspended Solids	1,800-2,800	2,400	17,000
Total Solids	11,700-13,100	12,500	88,100
Oil & Grease	3-67	44	290
Turbidity, JTU	90-130	105	
PCB Arclor 1248, µg/l	10-42	22	0.16
Copper	0.15-0.16	0.16	1.1
Cadmium	0.02-0.08	0.05	0.35
Zinc	0.39-0.84	0.56	3.9
Total Chromium	0.01-0.04	0.03	0.20
Lead	0.16-0.25	0.20	1.4

---

[a] All units are in mg/l unless otherwise noted.

C. SUMMARY AND CONCLUSIONS

1. The Quaker Oats Company discharges without treatment an effluent to the Wolf Interceptor containing an average daily loading of 28,000 pounds of BOD; 25,400 pounds, TOC; 54,000 pounds, COD; 17,000 pounds, suspended solids; and 38,100 pounds of total solids.

2. Lack of a municipal waste treatment system results in raw wastewaters being discharged directly to the Mississippi River via the interceptor system.

3. The temperature and pH range of the discharge approach the limits set forth in Memphis City Ordinance No. 460.

4. The discharge of The Quaker Oats Company to the Mississippi River and the presence of PCB Arclor 1242 contributes to violations of the Federally approved water quality criteria established by the Tennessee Water Quality Control Board.

5. The Quaker Oats Company discharges a second waste stream to the Wolf River. Based on Company data this effluent was not sampled.

6. To discharge to the Wolf River The Quaker Oats Company has applied for a U. S. Army Corps of Engineers permit. However, the discharge of the second industrial waste stream -- with high TOC, COD, BOD, and solids loadings, into the Mississippi River via the Wolf Interceptor without a permit (U. S. Army Corps of Engineers) is a violation of Section 407, Rivers and Harbors Act of 1899 (33 USC: 401-413).

D. RECOMMENDATIONS

It is recommended that:

1. The Quaker Oats Company provide adequate treatment in order to reduce the highly carbonaceous and toxic load from its effluent to the levels attainable employing best practicable treatment. These levels are:

Component	mg/l	lb/day
BOD	30	200
COD	100	660
Suspended Solids	30	200
PCB	None	None
Oil and Grease	5	30

The pH shall be maintained between 5.5 and 9.5.

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973
- Complete construction June 30, 1974
- Meet treatment criteria herein outlined by December 30, 1974.

3. EPA in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department will monitor the quality of the discharge.

4. Upon the failure of The Quaker Oats Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2, appropriate abatement proceedings under the Rivers and Harbors Act of 1899 be initiated.

JOS. SCHLITZ BREWING COMPANY
P. O. BOX 18309
HOLIDAY CITY STATION
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Memphis plant of the Jos. Schlitz Brewing Company presently makes 100,000 barrels of beer per month using barley, malt, corn, and hops as the raw materials.

The plant began operation in August 1971, and production is expected to increase. While the plant was being built, certain in-plant measures were adopted in order to reduce the load to the sewer. The effluent from the spent-grain press is centrifuged, and the liquor is sent to a concentrator where it is reduced to a thick syrup. This is then remixed with the spent grain and sold as a product.

Water is supplied from Company wells. About 1.5 mgd is used on production days and 0.4 mgd on non-production days. It is used in the following areas: making beer-14%; sanitary system-1%; cooling water-25%; makeup water for cooling towers and evaporative condensers-10%; and washdown and clean-up-50%. Approximately 95 percent of the water used for cooling is recycled.

The Company employs 300 persons to operate the plant continuously 5 days a week. This schedule will change as production increases.

Chronology of Contacts

Assistant Plant Manager Pat Reilly was contacted both by telephone and by letter on January 12 and 20, 1972. W. C. Smith of the Environmental

Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D), informed him of the coming investigation in the Memphis area. During January 1972, George Harlow, Chief, Enforcement Branch, Region IV, EPA, wrote a letter to Mr. Reilly [Appendix C], confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the Jos. Schlitz Brewing Company that information provided and data regarding discharges from the premises of the Company may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 2, 1972, Mr. Reilly granted, in a reply letter to Mr. Harlow, written permission for EPA to sample.

On February 11, 1972, W. C. Smith and E. Mann of NFIC-D, EPA, met with Mr. Reilly and James Humble of Schlitz. The Company personnel gave the EPA representatives a tour of the plant and explained the water uses and discharges. Arrangements were then made for sampling.

B. WASTE SOURCES AND TREATMENT

All brewery wastes are collected within the plant and discharged through a Parshall flume, sampling station S-24, [Figure S-1] to the Nonconnah Interceptor. There is no pretreatment except for the in-plant measures used to recover spent grain and liquor and to recycle cooling water.

An application for a permit to discharge has not been filed with the U. S. Army Corps of Engineers.

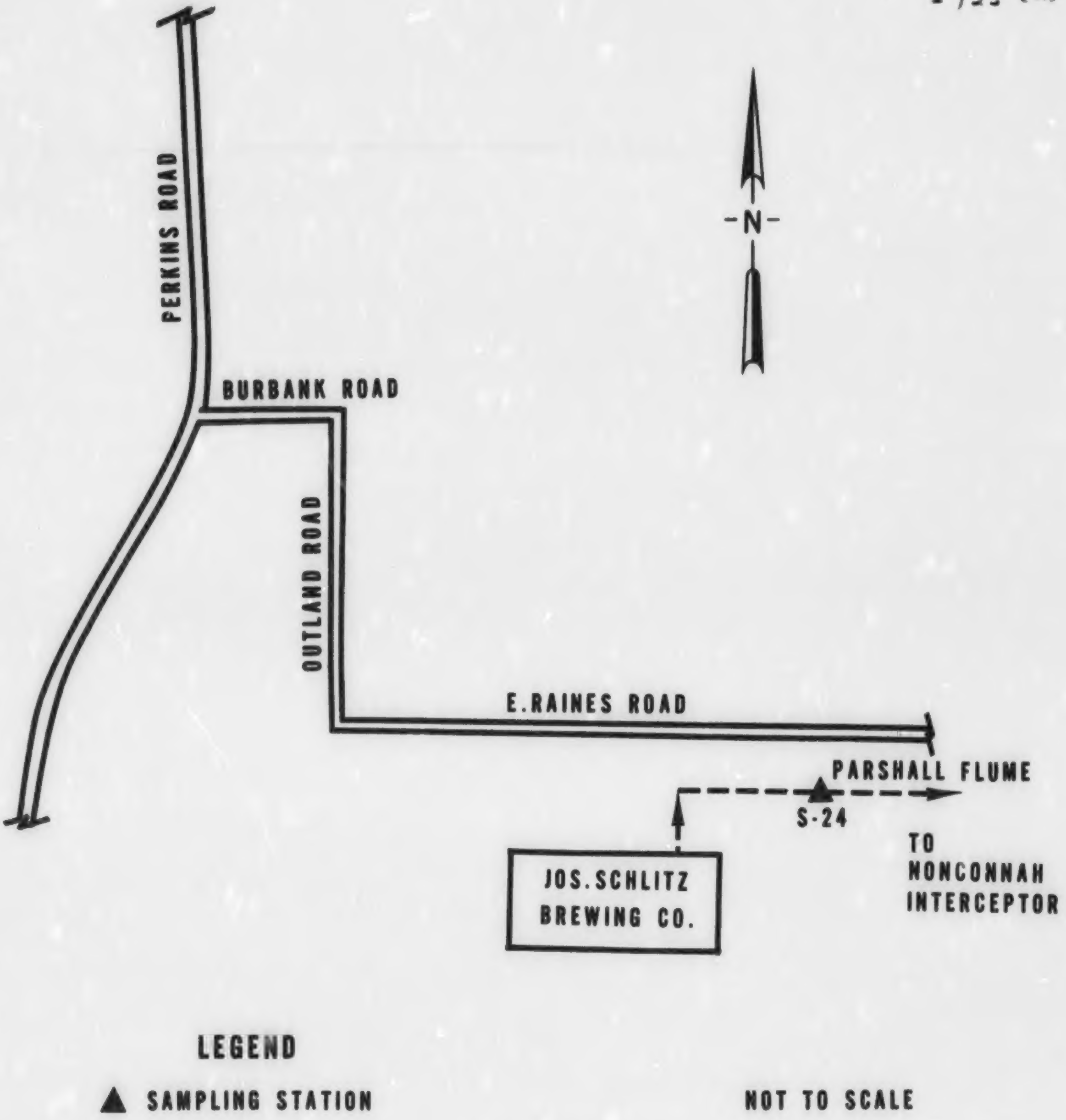


Figure S-1 Jos.Schlitz Brewing Company Memphis,Tennessee
Sampling Station S-24

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The discharge was sampled in a Parshall flume [Figure S-1] on Company property. From February 22 to February 25, 1972, a SERCO automatic sampler collected one sample every hour for three 24-hr periods. At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses and were then transported to an EPA mobile laboratory in Memphis or shipped air freight/express to the EPA NFIC-D laboratory. Flow readings were obtained from a Company flow meter. Grab samples were collected twice daily for temperature, pH, and conductivity and once per day for oil and grease analyses.

Discussion of Results

The pH of the discharge ranged from 6.2 to 10.5. The effluent contained an average of 10,100 pounds of BOD; 6,810 pounds, TOC; and 19,600 pounds of COD per day to the Mississippi River via the Nonconnah Interceptor. This corresponded to average concentrations of 1,234 mg/l BOD, 833 mg/l TOC, and 2,410 mg/l COD [Table S-1].

Article IV, Section 5(j), City of Memphis Ordinance No. 460 prohibits the discharge of wastes having a pH greater than 9.5. Section 5(h) prohibits the discharge of materials which exert unusual BOD and COD requirements.

The reach of the Mississippi that receives the discharge from the Nonconnah Interceptor is classified by the Tennessee Water Quality Control Board for industrial uses; fish and aquatic life; irrigation; livestock watering; wildlife; and navigation. Under the criteria

TABLE S-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
JOS. SCHLITZ BREWING COMPANY
February 22-25, 1972

Parameter[a]	Range	Average	Load lb/day
Flow (mgd)	0.940-1.033		
pH	6.2-10.5		
Temperature (°C)	21.5-31.0		
Conductivity (μmhos/cm)	200-800		
BOD	1,100-1,300	1,230	10,100
TOC	760-940	833	6,810
COD	2,140-2,640	2,410	19,600
Suspended Solids	324-544	428	3,460
Total Solids	1,570-2,010	1,780	14,500
Oil & Grease	6-29	18	140
Turbidity (JTU)	50-80	67	

---

a/ All units are in mg/l except as noted.

established by the State, pollutants shall not be added to the water in quantities which may be detrimental to any of these water uses.

Brewery wastes, characteristically high in organic loadings and free from toxic chemicals and heavy metals, are readily treatable by current water pollution control technology practices. These practices must be adopted to reduce the load being discharged to the City sewer.

D. SUMMARY AND CONCLUSIONS

1. The Jos. Schlitz Brewing Company discharges an untreated effluent containing an average daily loading of 10,100 pounds of BOD; 6,810 pounds, TOC; and 19,600 pounds of COD into the Mississippi River via the Nonconnah Interceptor.

2. The Jos. Schlitz Brewing Company takes certain in-plant measures to segregate strong spent-grain wastes from the discharge. This procedure does not sufficiently reduce the load being discharged.

3. Lack of a municipal waste treatment system results in raw wastewaters being discharged directly into the Mississippi River via the interceptor system.

4. The pH range and high BOD, COD, and TOC loadings violate sections of the Memphis City Ordinance No. 460.

5. Discharge, into the Mississippi River, of industrial wastes containing high BOD, COD, and TOC loads without a permit from the U. S. Army Corps of Engineers is a violation of Section 407, Rivers and Harbors Act of 1899 (33 U.S.C.; 401-413).

E. RECOMMENDATIONS

It is recommended that:

1. The Jos. Schlitz Brewing Company maintain the pH of the discharge stream between 5.5 and 9.5, and provide pollution control facilities in order to reduce biochemical oxygen demand, chemical oxygen demand, and suspended solids to the levels consistent with City Ordinance No. 460 and comparable with domestic sewage. These levels are:

Component	mg/l	lb/day
BOD	240	2,000
COD	960	8,000
Suspended Solids	300	2,500
Oil and Grease	100	800

2. An implementation schedule for the pollution control facilities be established as follows:

   - Initiate construction June 30, 1973.
   - Complete construction June 30, 1974.
   - Meet treatment criteria herein outlined by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with the Recommendations Numbers 1 and 2.

4. Upon the failure of the Jos. Schlitz Brewing Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2, appropriate abatement proceedings under the Rivers and Harbors Act of 1899 be initiated.

THE SMALLEY MAGNESIUM COMPANY
A DIVISION OF PIPER INDUSTRIES, INC.
719 PIPER STREET
COLLIERVILLE, TENNESSEE

A. BACKGROUND INFORMATION

General

The Smalley Magnesium Company, a division of Piper Industries, is a producer of magnesium battery cans. The cans are formed from magnesium rod and tubing through various mechanical processes using a graphite lubricant. After the cans are formed, they must be thoroughly cleaned. This is accomplished by passing them through three baths in series and by rinsing them after each bath. The first bath, a caustic one, consists of sodium hydroxide, trisodium phosphate, and a wetting agent; the second bath contains glacial acetic acid, sodium nitrate, and water; the third is a solution of sodium nitrate and calcium fluoride.

The Company employs 35 people and operates round the clock six days a week.

A plant well supplies 250,000 gallons of water per day. A small portion is used as make-up water for the baths and as cooling water for the cutting process. The bulk of the water is employed in rinsing the cans after each bath.

In 1969 the Smalley Magnesium Company (then Piper Brothers Plow Works, Inc.) was discharging wastewater containing chrome to the City of Collierville sanitary sewer system which introduced the wastes into the stabilization lagoon. In July 1969, Memphis and Shelby County Health Department officials discovered that the chromium wastes discharged to the Collierville treatment lagoon by the Company killed many of the organisms necessary for the decomposition process and that the lagoon's effluent contained about 3 mg/l chromium.

The Company was told to remove its wastewater from the sanitary sewer. The Health Department officials discussed this matter with both the Company owner and the manufacturing engineer. Verbally, they agreed that plating would be kept to a minimum for a few months and that wastewaters would be collected in a pond and batch treated to a safe level (approved by the health officials) before being discharged. There would be no unapproved discharges. The Company later increased the scope of the plating operations, and Company officials made plans to have proper treatment facilities constructed. Batch treatment (under previous conditions) would be allowed to continue until the new facilities were completed.

In July 1970, Memphis and Shelby County and State Health officials visited the plant and observed untreated wastewater entering the storm sewer. Although the source of the discharge was the collection pond, it amounted to an untreated overflow. Samples of the discharge were taken; the concentration of chromium was found to be 900 mg/l.

During an unexpected visit to the Company on September 24, 1970, State Health officials found that wastes were discharged from the plant without being routed to the holding pond.

This series of actions prompted the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department to issue a warrant to the Piper Brothers Plow Works, Inc. for violation of the Tennessee Public Nuisance Ordinance. The Company was found guilty of violating this ordinance.

Chronology of Contacts

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter [Appendix C] to Jim Baird, Manufacturing Engineer, advising him of the date of the investigation and requesting written permission to sample. This method was taken to advise the Smalley Magnesium Company that the information provided, and data regarding discharges from the premises of the Company, may be used as evidence against the firm in abatement proceedings under the applicable laws. On February 3, 1972, Mr. Baird in replying to Mr. Harlow's letter granted EPA written permission to sample the effluent.

The Smalley Magnesium Company was visited on Tuesday, February 15, 1972, by E. Mann of NFIC-D, EPA, and Bobby W. Fisher of the Memphis and Shelby County Health Department. Mr. Baird discussed plant operations and explained the wastewater treatment and discharges. Arrangements were made for sampling.

B. WASTE SOURCES & TREATMENT

At the time of the survey two separate waste streams were being discharged. From 150,000 to 200,000 gallons per day (gpd) of cooling water, caustic and acidic rinse water, and sanitary sewage empties into an open ditch that discharges to the Wolf River.

The second (chromium waste) stream now undergoes treatment before discharge. Concentrated chromium wastes and chromium rinse water are being discharged batchwise to a pond (approx. 25,000 gpd) where the pH is adjusted for the proper treatment conditions. The contents of the pond are pumped through pipes where sulfur dioxide is added, in-line in order to convert hexavalent chromium to the trivalent form. The pH is again adjusted with a 25% sodium hydroxide solution to achieve the proper precipitating conditions, and the wastewater is discharged to a second pond of approximately 113,000 gallon capacity.

After settling in the second pond for about one day, the water is discharged to a ditch through a pipe located one foot below the surface of the pond. At the time of the NFIC-D visit the chromium sludge in the bottom of the settling pond was being dredged, and in addition, caustic was unavailable for treatment measures. As a result, two of the three days that had been planned for sampling the chromium pond were eliminated from the schedule. Further, the pond lining appeared to be torn and seepage was probably occurring.

Both of these effluents normally go to the City of Collierville treatment lagoon. However, on occasions, and during the time of the survey, the City facilities were overloaded. Therefore, the municipal sewer line was closed to the Company. Consequently, the discharge overflowed into the Wolf River. No permit application has been filed with the U. S. Army Corps of Engineers.

C. DISCUSSION OF IN-PLANT EVALUATION & RESULTS

Sampling Procedure

The rinse water was sampled at the point where it discharged to the ditch [Figure SM-1] that drained to the Wolf River. Beginning on February 22 and terminating February 25, 1972, a SERCO automatic sampler collected one sample every hour for three 24-hr periods.

133 (a)

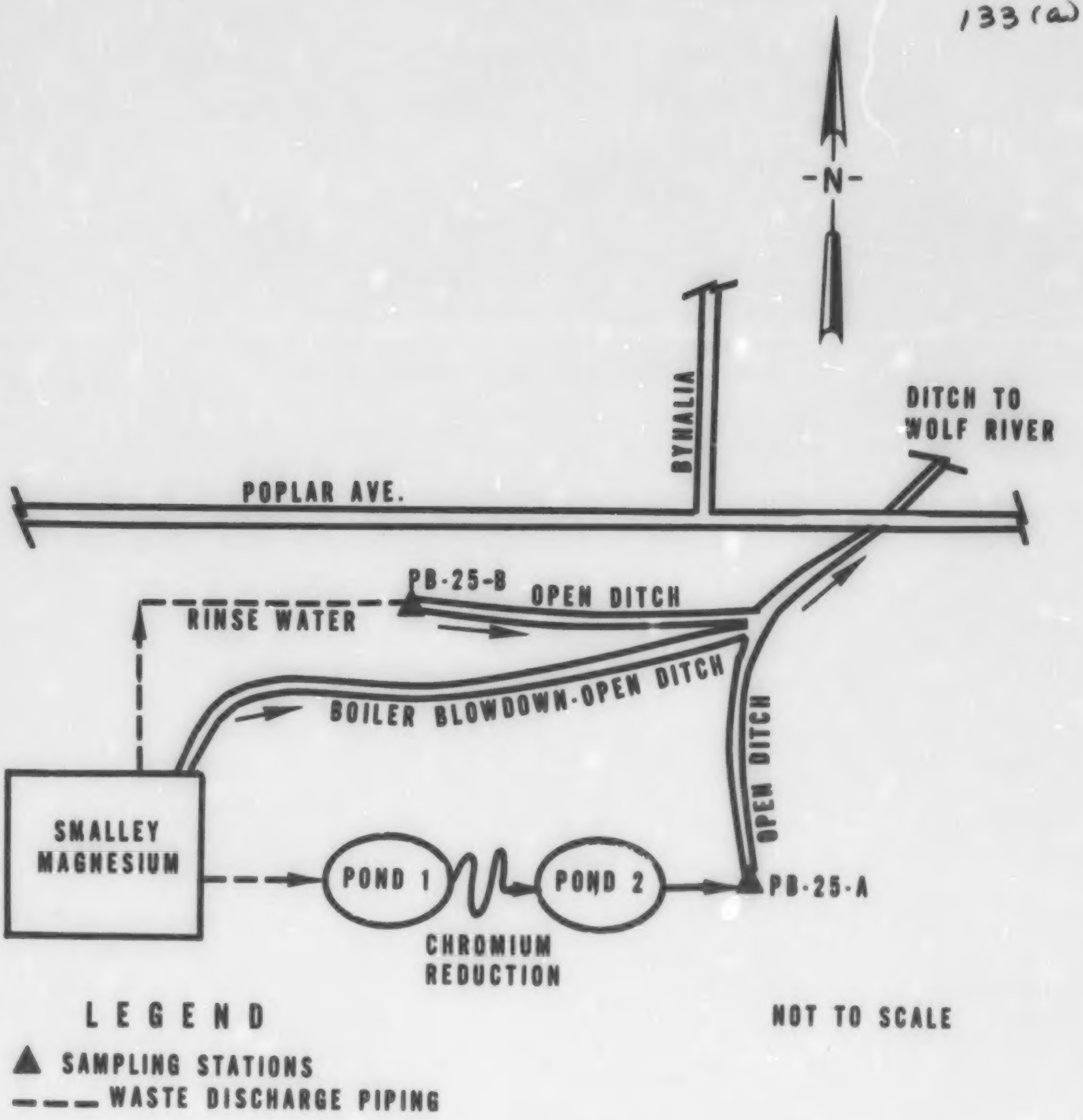


Figure SM-1 Smalley Magnesium Company Collierville, Tennessee
Sampling Stations PB-25-A, PB-25-B

At the end of each period the samples were composited and aliquoted to the appropriate containers for shipment and analyses. They were then transported to a mobile EPA laboratory in Memphis or shipped air freight/express to NFIC-D (EPA) laboratories. Grab samples were collected twice daily for temperature, pH, and conductivity.

The discharge from the chromium pond, sampled on February 25, 1972, began at 12:00 noon. At that time two grab samples were collected for chemical analyses, including oil and grease. Temperature, pH, and conductivity readings were taken periodically until the termination of the discharge at 2:20 PM. Readings were obtained from a flow-measuring device located at the pond outlet.

Discussion of Results

The rinse-water discharge was acidic with a pH range of 4.3 to 6.2. The water contained an average daily loading of 770 pounds of BOD; 253 pounds, TOC; and 667 pounds of COD. These loadings correspond to concentrations of 690, 216, and 571 mg/l, respectively, and to a flow rate of 125,000 to 228,000 gpd [Table SM-1].

The chromium treatment pond discharge was caustic, with a pH range of 11.3 to 12.3. The effluent contained an average of 160 mg/l chromium or 16.8 lb in the 12,600-gal. discharge.

The section of the Wolf River receiving these discharges is classified by the State of Tennessee for use for domestic raw water supply, industrial, fish and aquatic life, recreation, irrigation and livestock watering, and wildlife. The discharge of chromium and the heavy BOD, COD,

TABLE SM-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
THE SMALLEY MAGNESIUM COMPANY
February 22-25, 1972

Parameter[a]	Rinse and Cooling Water			Chromium Treatment Pond		
	Range	Average	Load lb/day	Range	Average	Load lb/day
Flow	125,000-228,000 gpd				12,600 gal/batch	
pH	4.3-6.2			11.3-12.3		
Temperature, °C	11.5-18.5			17.5-20.0		
Conductivity, µmhos/cm	370-500			30,000-34,000		
BOD	130-1,800	690	770			
TOC	64-505	216	253			
COD	150-1,320	571	667			
Suspended Solids	34-92	56	74			
Total Solids	270-1,790	800	900			
Oil & Grease		5[b]	5[b]			
Turbidity, JTU	7-45	20				
Phenolic Materials	<0.05[b]-0.05	<0.05				
Copper	0.02-0.21	0.09	0.11		0.05[b]	0.005
Cadmium	<0.01[c]	<0.01[c]			0.06[b]	0.006
Zinc	0.33-1.6	0.87	1.03		0.05[b]	0.005
Total Chromium	0.04-0.06	0.05	0.08	120-200	160	16.8
Mercury, µg/l	0.2-0.7	0.5	0.75			
Lead	0.03-0.07	0.04	0.06		0.28[b]	0.03

---

a/ All units are in mg/l unless otherwise noted.
b/ One value.
c/ Minimum detectable limit.

and TOC loading may be in violation of the Tennessee Water Quality Criteria that prohibit the addition of toxic substances and other pollutional loads.

It is evident that the City of Collierville treatment system cannot adequately treat the wastewater from Smalley Magnesium. Facilities at the Company plant should be installed to treat the acid waste stream in order to increase the pH and to yield BOD and suspended solids concentrations below 30 mg/l.

Current technology and careful control of the chromium waste treatment system could produce an effluent having a chromium concentration below 0.1 mg/l. The present system at Smalley Magnesium should be improved or replaced with one that could satisfactorily treat the strong wastes.

D. SUMMARY AND CONCLUSIONS

1. The Smalley Magnesium Company discharges an effluent containing an average daily load of 770 pounds of BOD; 253 pounds, TOC; 667 pounds, COD; and 16.8 pounds of chromium into the Wolf River.

2. The Smalley Magnesium Company is discharging its wastes into the Wolf River because the City of Collierville has not accepted the effluent.

3. There is no treatment for the rinse water discharged; treatment for chromium wastes is inadequate, resulting in high concentrations of chromium discharged into the Wolf River.

4. The presence of chromium in the effluent to the Wolf River and the low pH and chemical and organic loading in the rinse-water discharge violate the water quality criteria established by the Tennessee Water Quality Control Board.

5. Discharge into the Wolf River of industrial wastes, containing high BOD, TOC, and COD loads and heavy metals, without a permit from the U. S. Army Corps of Engineers may violate Section 407, Rivers and Harbors Act of 1899 (33 U.S.C.: 401-413).

E. RECOMMENDATIONS

It is recommended that:

1. The Smalley Magnesium Company provide treatment facilities for the rinse water stream in order to increase the pH and to reduce the BOD and suspended solids to a concentration of 30 mg/l and reduce chrome concentration to 0.1 mg/l. These levels are attainable by employing best practicable treatment.

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria outlined herein by December 30, 1974.

3. The Smalley Magnesium Company file an application for a permit to discharge with the U. S. Army Corps Engineers.

4. Upon the failure of the Smalley Magnesium Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2, appropriate abatement proceedings under the Rivers and Harbors Act of 1899 be initiated.

VALLEY PRODUCTS COMPANY
334 BROOK AVENUE
MEMPHIS, TENNESSEE

A. BACKGROUND INFORMATION

General

The Valley Products Company is a chemical plant that manufactures industrial chemicals and soaps. This plant uses animal fats and oils as raw materials; these are converted into industrial soaps. Water from the Memphis distribution system is used for cooling, processing, and clean-up in the plant area. The Company employs 27 people to operate the plant on one shift, five days per week.

Chronology of Contacts

On October 7, 1971, W. C. Smith of the Environmental Protection Agency (EPA), National Field Investigations Center-Denver (NFIC-D) and Joseph Alleman, EPA, Baton Rouge Field Station, conducted a preliminary inspection of the Valley Products plant. James A. Breazeale, President, Valley Products, was apprised of the purpose of the survey. Mr. Breazeale indicated that the plant effluent is discharged to the City of Memphis interceptor and that his firm had not filed a permit application.
Mr. Breazeale cooperated with the EPA and granted permission to sample the Valley Products effluent.

During January 1972, George Harlow, Chief, Enforcement Branch, EPA, Region IV, wrote a letter to Mr. Breazeale [Appendix C] confirming the date of the investigation and requesting written permission to sample. This method was taken to advise the Valley Products Company that information provided and data regarding discharges from the premises of the

Company may be used as evidence against the firm in abatement proceedings under the applicable laws.

On February 4, 1972, Mr. Breazeale, in replying to Mr. Harlow's letter, granted EPA permission to sample [Appendix C].

B. WASTE SOURCES AND TREATMENT

Waste from Valley Products Company containing organic matter, grease, and suspended solids is discharged to the Nonconnah Interceptor without pretreatment. Effluent flow is continuously measured and recorded. The process waste stream is identified as VP-23 [Figure C-1]. The Company has not filed for a U.S. Army Corps of Engineers permit application for this discharge.

C. DISCUSSION OF IN-PLANT EVALUATION AND RESULTS

Sampling Procedure

The wastewater flow (sample station VP-23) was sampled on plant property, downstream from the flow-measuring device, before discharge to the Nonconnah Interceptor [Figure C-1]. Samples were collected at approximately 60-minute intervals using a SERCO automatic sampler. The sampling began February 22, 1972, and was completed February 25, 1972. Twenty-four 1-hr samples from the SERCO were composited into one sample, and a fixed aliquot was placed in the appropriate container for shipment and analyses. Samples requiring immediate analyses were transported to a mobile EPA laboratory in Memphis and the other samples were preserved and shipped by air-freight to the EPA NFIC-D laboratory. Grab samples were collected twice daily for temperature, pH, and conductivity, and once daily for oil and grease analyses.

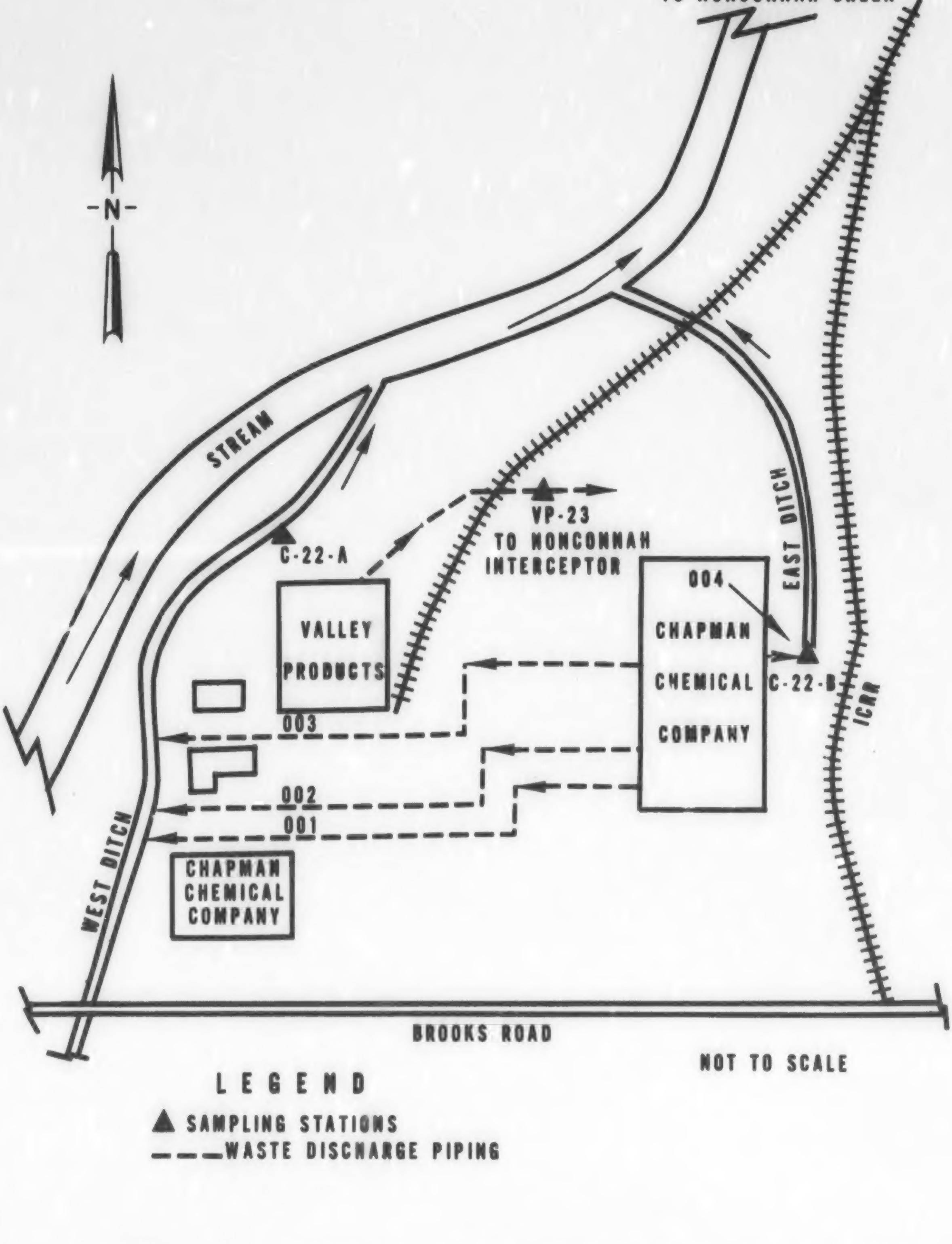


Figure C–1 Chapman Chemical Company and Valley Products Memphis, Tennessee

Sampling Stations C-22-A, C-22-B, VP-23

Discussion of Results

At the time of the survey, the Valley Products effluent [Table VP-1] had a pH range of 5.6-9.0 and a temperature range of 17.0-51.0 °C. The discharge to the City interceptor contained average loads of 1,750 pounds of BOD; 1,100 pounds, TOC; 2,260 pounds, COD; and 200 pounds of oil and grease. The concentrations of BOD, TOC, COD, were 4,630 mg/1, 3,760 mg/1 and 7,760 mg/1, respectively.

Article IV Section 5(b), City of Memphis Ordinance No. 460 prohibits the discharge of oil and grease in excess of 100 mg/1. The discharge from Valley Products had an average concentration of 560 mg/1 oil and grease.

D. SUMMARY AND CONCLUSIONS

1. The Valley Products Company discharged an untreated effluent that contained an average daily load of 1,750 pounds of biochemical oxygen demand; 1,100 pounds, total organic carbon; 2,260 pounds, chemical oxygen demand; and 200 pounds of oil and grease into the Mississippi River via the Nonconnah Interceptor.

The average concentrations for oil and grease and for BOD, TOC, COD were high. These were: BOD, 4,630 mg/1; TOC, 3,760 mg/1; COD, 7,760 mg/1; and oil and grease, 560 mg/1.

2. The presence of a high concentration (560 mg/1) of oil and grease is in violation of the Memphis City Ordinance No. 460.

3. Discharge into the Mississippi River of industrial wastes containing high BOD, COD, TOC, and oil and grease concentrations, without a permit from the U.S. Army Corps of Engineers is in violation of Section 407, Rivers and Harbors Act of 1899 (33 U.S.C.; 401-413)

TABLE VP-1

SUMMARY OF FIELD DATA AND ANALYTICAL RESULTS
VALLEY PRODUCTS COMPANY
February 22-25, 1972

Parameter[a]	Range	Average	Load lb/day
Flow (mgd)	0.0025-0.0693		
pH	5.6-9.0		
Temperature, °C	17.0-51.0		
Conductivity (μmhos/cm)	900-15,000		
BOD	3,300-7,300	4,630	1,750
TOC	1,720-4,900	3,760	1,100
COD	6,338-10,100	7,760	2,260
Suspended Solids	356-2,200	1,130	230
Total Solids	6,410-23,600	14,200	5,260
Oil & Grease	160-980	560	200
Turbidity (JTU)	200-550	340	
Phenolic Materials	0.8-1.5	1.2	0.38
Atrazine (μg/l)	6-33	15	0.005
Copper	0.05-0.07	0.06	0.02
Cadmium	0.02-0.04	0.03	0.01
Zinc	0.18-0.67	0.42	0.17
Total Chromium	<0.01[b]-0.04	0.02	
Lead	0.15-0.25	0.19	0.06

---

[a] All units are in mg/l except as noted.

[b] Minimum detectable limit.

E. RECOMMENDATIONS

It is recommended that:

1. Valley Products provide pollution control facilities in order to reduce biochemical oxygen demand, chemical oxygen demand, suspended solids, and oil and grease to the levels consistent with those in City Ordinance No. 460 and comparable to domestic sewage. These levels are:

Component	mg/1	lb/day
BOD	240	80
COD	960	320
Suspended Solids	300	100
Oil & Grease	100	30

2. An implementation schedule for the pollution control facilities be established as follows:

- Initiate construction June 30, 1973.
- Complete construction June 30, 1974.
- Meet treatment criteria herein outlined by December 30, 1974.

3. EPA, in cooperation with the Tennessee Water Quality Control Board and the Memphis and Shelby County Health Department, monitor the quality of process waste discharges to ensure compliance with the Recommendations Numbers 1 and 2.

4. Upon the failure of the Valley Products Company to provide a satisfactory documented commitment to achieve the goals identified in Recommendations 1 and 2, appropriate abatement proceedings under the Rivers and Harbors Act of 1899 be initiated.

APPENDIX A

APPLICABLE WATER QUALITY REGULATIONS

APPENDIX A

APPLICABLE WATER QUALITY REGULATIONS

The Mississippi River is an interstate and navigable stream. McKellar Lake, the Wolf River, and Nonconnah Creek are interstate waters tributary to the Mississippi River and, therefore, tributaries of a navigable stream. Pollution of interstate streams is subject to abatement under provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et. seq.). Water quality standards applicable to the Mississippi River and its interstate tributaries have been established by the states of Arkansas, Mississippi and Tennessee and approved as Federal standards pursuant to the provisions of the Water Quality Act of 1965. The Rivers and Harbors Act of 1899 is applicable to discharges of industrial wastes to navigable waters. All three states require waste sources to obtain permits in order to discharge to surface streams. These water quality regulations are discussed below.

A. REFUSE ACT PERMIT PROGRAM (RAPP)

The Rivers and Harbors Act of 1899 prohibits the discharge of industrial wastes to navigable waters without a permit from the U.S. Army Corps of Engineers. Section 13 of the Act, referred to as the Refuse Act of 1899, makes it unlawful to discharge from any "...manufacturing establishment, or mill of any kind, any refuse matter of any kind or description whatever other than that flowing from streets and sewers and passing therefrom in a liquid state, into any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable water..." provided that a discharge may be permitted under certain conditions specified by the Corps of Engineers.

Executive Order No. 11574, signed by President Nixon on December 23, 1970, tightened enforcement of the Refuse Act of 1899 by requiring that all sources of industrial wastes discharging to navigable waters or their tributaries must apply to the Corps of Engineers by July 1, 1971, for permits to continue such discharges.

B. FEDERAL WATER POLLUTION CONTROL ACT

Enforcement Conference Requirements

Section 10(a) of the Federal Water Pollution Control Act, as amended (hereafter referred to as the Act), provides that "the pollution of interstate or navigable waters in or adjacent to any State or States ... which endangers the health or welfare of any persons, shall be subject to abatement as provided in this Act".

One step in securing such abatement is the calling of a Federal-State Enforcement Conference. Section 10(d) of the Act provides the following basis for calling such a conference:

"the Secretary* shall also call such a conference whenever, on the basis of reports, surveys or studies, he has reason to believe that any pollution referred to in subsection (a) and endangering the health or welfare of persons in a State other than that in which the discharge or discharges originate is occurring; ...".

---

* Prior to May, 1966, the Act was administered by the Secretary of Health, Education, and Welfare. The Secretary of the Interior then administered the Act until December, 1970, when this function was transferred to the Administrator of EPA.

Section 10(d)(1) also provides several ways in which an enforcement conference could be called to consider pollution of interstate streams in the Memphis metropolitan area. If pollution originating in one State endangers the health or welfare of persons in another State or States, the Administrator may call a conference "whenever requested by the Governor of any State or a State water pollution control agency, or (with the concurrence of the Governor and of the State water pollution control agency for the State in which the municipality is situated) the governing body of any municipality". When pollution is confined to one State, the Administrator may call a conference only at the request of the Governor of that State.

Abatement of Standards Violations

Sections 10(c) and (g) of the Act provide means for abating pollution which is causing violations of the Federal-State water quality standards discussed above. Section 10(c)(5) provides that a notice shall be issued to violators of the standards at least 180 days before an abatement action is initiated in the courts. If reasonable action is not taken by the violators within the 180-day period to secure abatement of pollution, a direct court action can be requested under the provisions of Section 10(g). In cases where the discharge or discharges causing the violations are located in a different State than the location of the violations, the

Administrator of EPA can request the Attorney General to bring suit on behalf of the United States to secure abatement of pollution. In cases where the discharges and violations are located in the same State, the written consent of the Governor of that State is required before court action can be requested.

With regard to violations of Mississippi or Arkansas standards for the Mississippi River by pollution from the waste sources in Memphis, Tennessee, direct court action could be requested by the Administrator. For violations of standards for the Mississippi River in Tennessee and for the Wolf River, McKellar Lake and Nonconnah Creek by pollution from Memphis sources, the consent of the Governor of Tennessee would be required prior to initiating court action.

State Certification

Section 21(b) of the Federal Water Pollution Control Act, as amended by the Water Quality Improvement Act of 1970, provides that "Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters of the United States, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate, that there is reasonable assurance, as determined by the State or interstate agency that such activity will be conducted in a manner whith will not violate applicable water quality standards."

All industrial waste sources applying for discharge permits under the provisions of the Refuse Act are required to obtain a State certification as discussed above. In addition, other activities such as construction of structures in navigable waters, because such activity requires a Federal permit, must also obtain a State certification.

Discharges to navigable waters existing prior to April 3, 1970, are allowed until April 3, 1973 to receive certification.

Oil Pollution Regulations

Federal rules regulating the discharge of oil to navigable waters were established on September 11, 1970, pursuant to the provisions of Section 11(b)(3) of the Federal Water Pollution Control Act, as amended by the Water Quality Improvement Act of 1970. These rules prohibit discharges of oil to navigable waters from any source which:

"(a) Violate the applicable water quality standards, or

(b) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines."

Waste discharges in the Memphis area must comply with these regulations.

Water Quality Standards

Section 10(c) of the Act, as amended by the Water Quality Act of 1965, provides that the States be given the opportunity to establish by June

30, 1967, water quality standards applicable to all interstate and coastal waters. These standards were to consist of water quality criteria applicable to each interstate stream or portion thereof and a plan for implementation and enforcement of the criteria. Arkansas, Mississippi and Tennessee established such standards and submitted them for Federal approval as required. Details of the standards of each State are discussed in the following paragraphs.

C. STATE STANDARDS

Arkansas

Water quality standards applicable to all interstate streams in Arkansas including the Mississippi River were established by the Arkansas Pollution Control Commission in June 1967, and were subquently fully approved as Federal standards on August 7, 1967.

In general, the Arkansas water quality criteria applicable to the Mississippi River are equal to or less restrictive than the Tennessee or Mississippi criteria assigned to the same waters. An important exception occurs in the reach between Loosahatchie Bar and the Tennessee-Mississippi state line. Tennessee established no bacteriological criterion for this reach. Thus, the Arkansas criterion is limiting.

Mississippi

The structure of the Mississippi standards is similar to that of the Tennessee standards. Water uses were designated for each stream reach and specific water quality criteria established for each water use. Mississippi designated fish and wildlife as the only water use for the

Mississippi River. The specific criteria for fish and wildlife uses are comparable to the Tennessee criteria with the exception of the 4.0 mg/l minimum limit for dissolved oxygen concentrations. This limit is not federally approved.

No waste sources in the Memphis vicinity were listed in the Mississippi implementation plan.

Tennessee

In the Memphis area, water quality standards were established for McKellar Lake, Nonconnah Creek and the Wolf River in addition to those for the Mississippi River. Standards were not established for the only other sizeable stream in the area, the Loosahatchie River, because it is an intrastate stream.

[Designated water uses to be protected and stream reach boundaries are summarized in Table A-1.]

Tennessee requires secondary treatment or the equivalent as the minimum level of waste treatment for all discharges to interstate waters. Secondary treatment is defined as 75 to 90 percent removal of the 5-day biochemical oxygen demand and from 80 to 90 percent suspended solids removal.

The revised Tennessee State Standards are in the Water Quality Criteria that follow.

TABLE A-I

DESIGNATED WATER USES

Stream	Reach	Water Uses
	Tennessee	
Mississippi River	Mississippi-Tennessee State Line to upstream end of Loosahatchie Bar	Industrial, fish & aquatic life, irrigation, livestock watering & wildlife, navigation
Mississippi River	Upstream end of Loosahatchie Bar to Kentucky-Tennessee State Line	Domestic raw water supply, industrial, fish & aquatic life, irrigation, recreation, livestock watering & wildlife, navigation
Wolf River	Mouth to L & N Railroad Bridge	Fish & aquatic life
Wolf River	L & N Railroad Bridge to Mississippi-Tennessee State Line	Domestic raw water supply, industrial, fish & aquatic life, recreation, irrigation, livestock watering & wildlife
Nonconnah Creek	Mouth to bridge on Winchester Road	Fish & aquatic life, livestock watering & wildlife
Nonconnah Creek	Winchester Road to Headwaters in Fayette County	Fish & aquatic life, recreation, livestock watering & wildlife
McKellar Lake		Industrial, fish & aquatic life, recreation, navigation
	Arkansas	
Mississippi River	Missouri-Arkansas State Line to Louisiana-Arkansas State Line	Partial body contact recreation, fish & aquatic life, assimilalation of treated wastes, navigation
Mississippi River	Mississippi-Tennessee State Line to Mississippi-Louisiana State Line	Fish & wildlife

GENERAL WATER QUALITY CRITERIA FOR THE DEFINITION AND CONTROL OF POLLUTION IN THE WATERS OF TENNESSEE

Adopted on May 26, 1967
Amended on November 17, 1967, May 22, 1970, October 26, 1971, and
December 14, 1971

Tennessee Water Quality Control Board

The Water Quality Control Act of 1971, Chapter 164 Public Acts of 1971 as Amended by Chapter 386, makes it the duty of the Water Quality Control Board to study and investigate all problems concerned with the pollution of the waters of the State and with its prevention, abatement, and control and to establish such standards of quality for any waters of the State in relation to their reasonable and necessary use as the Board shall deem to be in the public interest and establish general policies relating to existing or proposed future pollution as the Board shall deem necessary to accomplish the purpose of the Control Act. The following general considerations and criteria are officially adopted by the Board as a guide in determining the permissible conditions of waters with respect to pollution and the preventive or corrective measures required to control pollution in various waters or in different sections of the same waters.

GENERAL CONSIDERATIONS

1. Waters have many uses which in the public interest are reasonable and necessary. Such uses include: sources of water supply for domestic and industrial purposes; propagation and maintenance of fish and other desirable aquatic life; recreational boating and fishing; the final disposal of municipal sewage and industrial waste following adequate treatment; stock watering and irrigation; navigation; generation of power; and the enjoyment of scenic and esthetic qualities of the waters.

2. The rigid application of uniform water quality is not desirable or reasonable because of the varying uses of such waters. The assimilative capacity of a stream for sewage and waste varies depending upon various factors including the following: volume of flow, depth of channel, the presence of falls or rapids, rate of flow, temperature, natural characteristics, and the nature of the stream. Also the relative importance assigned to each use will differ for different waters and sections of waters throughout the stream.

3. To permit reasonable and necessary uses of the waters of the State, existing pollution should be corrected as rapidly as practical and future pollution controlled by treatment plants

or other measures. There is an economical balance between the cost of sewage and waste treatment and the benefits received. Within permissible limits, the dilution factor and the assimilative capacity of surface water should be utilized. Waste recovery, control of rates and dispersion of waste into the streams, and control of rates and characteristics of flow of waters in the stream where adequate, will be considered to be a means of correction.

4. Sewage, industrial wastes, or other wastes, as defined in The Water Quality Control Act of 1971, Chapter 164 Public Acts of 1971, as amended by Chapter 386, shall not be discharged into or adjacent to streams or other surface waters in such quantity and of such character or under such conditions of discharge in relation to the receiving waters as will result in visual or olfactory nuisances, undue interference to other reasonable and necessary uses of the water, or appreciable damage to the natural processes of self-purification. In relation to the various qualities and the specific uses of the receiving waters, no sewage, industrial wastes, or other wastes discharged shall be responsible for conditions that fail to meet the criteria of water quality outlined below. Bypassing or accidental spills will not be tolerated.

The criteria of water quality outlined below are considered as guides in applying the water quality objectives in order to insure reasonable and necessary uses of the waters of the State. In order to protect the public health and maintain the water suitable for other reasonable and necessary uses; to provide for future development; to allow proper sharing of available water resources; and to meet the needs of particular situations, additional criteria will be set.

CRITERIA OF WATER CONDITIONS

1. Domestic Raw Water Supply

   (a) Dissolved Oxygen - There shall always be sufficient dissolved oxygen present to prevent odors of decomposition and other offensive conditions.

   (b) pH - The pH value shall lie within the range of 6.0 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours.

   (c) Hardness or Mineral Compounds - There shall be no substances added to the waters that will increase the hardness or mineral content of the waters to such an extent to appreciably impair the usefulness of the water as a source of domestic water supply.

(d) Total Dissolved Solids - The total dissolved solids shall at no time exceed 500 mg/l.

(e) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character as may impair the usefulness of the water as a source of domestic water supply.

(f) Turbidity or Color - There shall be no turbidity or color added in amounts or characteristics that can not be reduced to acceptable concentrations by conventional water treatment processes.

(g) Temperature - The maximum water temperature change shall not exceed 3°C relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2°C per hour. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet, or mid-depth whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

(h) Microbiological Coliform - Coliform group shall not exceed 10,000 per 100 ml. as a monthly average value (either MPN or MF count); nor exceed this number in more than 20 per cent of the samples examined during any month; nor exceed 20,000 per 100 ml. in more than five per cent of such samples. These values may be exceeded provided the organisms are known to be of nonfecal origin. No disease producing bacteria or other objectionable organisms shall be added to surface waters which will result in the contamination of said waters to such an extent as to render the water unsuitable as sources of domestic water supply after conventional water treatment.

(i) Taste or Odor - There shall be no substances added which will result in taste or odor that prevent the production of potable water by conventional water treatment processes.

(j) Toxic Substances - There shall be no toxic substances added to the waters that will produce toxic conditions that materially affect man or animals or impair the safety of a conventionally treated water supply.

(k) Other Pollutants - Other pollutants shall not be added to the water in quantities that may be detrimental to public health or impair the usefulness of the water as a source of domestic water supply.

2. Industrial Water Supply.

(a) Dissolved Oxygen - There shall always be sufficient dissolved oxygen present to prevent odors of decomposition and other offensive conditions.

(b) pH - The pH value shall lie within the range of 6.0 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours.

(c) Hardness or Mineral Compounds - There shall be no substances added to the waters that will increase the hardness or mineral content of the waters to such an extent as to appreciably impair the usefulness of the water as a source of industrial water supply.

(d) Total Dissolved Solids - The total dissolved solids shall at no time exceed 500 mg/l.

(e) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character as may impair the usefulness of the water as a source of industrial water supply.

(f) Turbidity or Color - There shall be no turbidity or color added in amounts or characteristics that can not be reduced to acceptable concentrations by conventional water treatment processes.

(g) Temperature - The maximum water temperature change shall not exceed 3°C relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2°C per hour. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet, or mid-depth whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

(h) Taste or Odor - There shall be no substances added that will result in taste or odor that would prevent the use of the water for industrial processing.

(i) Toxic Substances - There shall be no substances added to the waters that may produce toxic conditions that will adversely affect the water for industrial processing.

(j) Other Pollutants - Other pollutants shall not be added to the waters in quantities that may adversely affect the water for industrial processing.

3. Fish and Aquatic Life.

(a) Dissolved Oxygen - The dissolved oxygen shall be maintained at 5.0 mg/l except in limited sections of the stream receiving treated effluents. In these limited sections, a minimum of 3.0 mg/l dissolved oxygen shall be allowed. The dissolved oxygen content shall be measured at mid-depth in waters having a total depth of ten (10) feet or less and at a depth of five (5) feet in waters having a total depth of greater than ten (10) feet. A minimum dissolved oxygen content of 6.0 mg/l shall be maintained in recognized trout streams.

(b) pH - The pH value shall lie within the range of 6.5 to 8.5 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours.

(c) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life.

(d) Turbidity or Color - There shall be no turbidity or color added in such amounts or of such character that will materially affect fish and aquatic life.

(e) Temperature - The maximum water temperature change shall not exceed 3°C relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 20°C. There shall be no abnormal temperature changes that may affect aquatic life unless caused by natural conditions. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet, or mid-depth whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

(f) Taste or Odor - There shall be no substances added that will impart unpalatable flavor to fish or result in noticeable offensive odors in the vicinity of the water or otherwise interfere with fish or aquatic life.

(g) Toxic Substances - There shall be no substances added to the waters that will produce toxic conditions that affect fish or aquatic life.

(h) Other Pollutants - Other pollutants shall not be added to the waters that will be detrimental to fish or aquatic life.

4. Recreation.

(a) Dissolved Oxygen - There shall always be sufficient dissolved oxygen present to prevent odors of decomposition and other offensive conditions.

(b) pH - The pH value shall lie within the range of 6.0 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours.

(c) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to recreation.

(d) Turbidity or Color - There shall be no turbidity or color added in such amounts or character that will result in an objectionable appearance to the water.

(e) Temperature - The maximum water temperature change shall not exceed 3°C relative to an upstream control point. The temperature of the water shall not exceed 30.5°C and the maximum rate of change shall not exceed 2°C per hour. The temperature of impoundments where stratification occurs will be measured at a depth of 5 feet, or mid-depth whichever is less, and the temperature in flowing streams shall be measured at mid-depth.

(f) Microbiological Coliform - The fecal coliform group shall not exceed 5,000 per 100 ml. as a monthly average value nor exceed this number in more than 20 per cent of the samples examined during any month nor exceed 20,000 per 100 ml. in more than five per cent of such samples. In those waters that are physically suitable and available to the public for water-contact recreation the fecal coliform concentration shall not exceed 1,000 per 100 ml. in any two consecutive samples collected during the months of May through September. Water areas near outfalls of domestic sewage treatment plants are not considered suitable for water-contact recreation.

(g) Taste or Odor - There shall be no substances added that will result in objectionable taste or odor.

(h) Toxic Substances - There shall be no substances added to the water that will produce toxic conditions that affect man or animal.

(i) Other Pollutants - Other pollutants shall not be added to the water in quantities which may have a detrimental effect on recreation.

5. Irrigation

(a) Dissolved Oxygen - There shall always be sufficient dissolved oxygen present to prevent odors of decompsition and other offensive conditions.

(b) pH - The pH value shall lie within the range of 6.0 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours.

(c) Hardness or Mineral Compounds - There shall be no substances added to the water that will increase the mineral content to such an extent as to impair its use for irrigation.

(d) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character as may impair the usefulness of the water for irrigation purposes.

(e) Temperature - The temperature of the water shall not be raised or lowered to such an extent as to interfere with its use for irrigation purposes.

(f) Toxic Substances - There shall be no substances added to water that will produce toxic conditions that will affect the water for irrigation.

(g) Other Pollutants - Other pollutants shall not be added to the water in quantities which may be detrimental to the waters used for irrigation.

6. Livestock Watering and Wildlife

(a) Dissolved Oxygen - There shall always be sufficient dissolved oxygen present to prevent odors of decomposition and other offensive conditions.

(b) pH - The pH value shall lie within the range of 6.0 to 9.0 and shall not fluctuate more than 1.0 unit in this range over a period of 24 hours.

(c) Hardness or Mineral Compounds - There shall be no substances added to water that will increase the mineral content to such an extent as to impair its use for livestock watering and wildlife.

(d) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character as to interfere with livestock watering and wildlife.

(e) Temperature - The temperature of the water shall not be raised or lowered to such an extent as to interfere with its use for livestock watering and wildlife.

(f) Toxic Substances - There shall be no substances added to water that will produce toxic conditions that will affect the water for livestock watering and wildlife.

(g) Other Pollutants - Other pollutants shall not be added to the water in quantities which may be detrimental to the water for livestock watering and wildlife.

7. Navigation

(a) Dissolved Oxygen - There shall always be sufficient dissolved oxygen present to prevent odors of decomposition and other offensive conditions.

(b) Hardness or Mineral Compounds - There shall be no substances added to the water that will increase the mineral content to such an extent as to impair its use for navigation.

(c) Solids, Floating Materials and Deposits - There shall be no distinctly visible solids, scum, foam, oily sleek, or the formation of slimes, bottom deposits or sludge banks of such size or character as to interfere with navigation.

(d) Temperature - The temperature of the water shall not be raised or lowered to such an extent as to interfere with its use for navigation purposes.

(e) Toxic Substances - There shall be no substances added to water that will produce toxic conditions that will affect the water for navigation.

(f) Other Pollutants - Other pollutants shall not be added to the water in quantities which may be detrimental to the waters used for navigation.

These criteria should not be construed as permitting the degradation of higher quality water when such can be prevented by reasonable pollution control measures. The above conditions are recognized as applying to waters affected by the discharge of sewage and/or industrial waste or other waste and not resulting from natural causes.

DEFINITIONS

1. Conventional Water Treatment - Conventional water treatment as referred to in the criteria denotes coagulation, sedimentation, filtration and chlorination.

2. Mixing Zone - Mixing zone refers to that section of flowing stream or impounded waters necessary for effluents to become dispersed.

   The mixing zone necessary in each particular case shall be defined by the Tennessee Water Quality Control Board.

INTERPRETATION OF CRITERIA

1. Interpretations of the above criteria shall conform to any rules and regulations or policies adopted by the Water Quality Control Board.

2. Insofar as practicable, the effect of treated sewage or waste discharges on the receiving waters shall be considered after they are mixed with the waters and beyond a reasonable zone of immediate effect upon the qualities of the waters. The extent to which this is practicable depends upon local conditions and the proximity and nature of other uses of the waters.

3. The technical and economical feasibility of waste treatment, recovery, or adjustment of the method of discharge to provide correction shall be considered in determining the time to be allowed for the development of practicable methods and for the specified correction.

4. The criteria set forth shall be applied on the basis of the following stream flows: unregulated streams - stream flows equal to or exceeding the 3-day minimum, 20-year recurrent interval; regulated streams - instantaneous minimum flow.

5. In general, deviations from normal water conditions may be undesirable, but the rate and extent of the deviations should be considered in interpreting the above criteria.

6. The criteria and standards provide that all discharges of sewage, industrial waste, and other wastes will receive the best practicable treatment (secondary or the equivalent) or control according to the policy and procedure of the Tennessee Water Quality Board. A degree of treatment greater than secondary when necessary to protect the water uses will be required for selected sewage and waste discharges.

TENNESSEE ANTIDEGRADATION STATEMENT

1. The Standards and Plan adopted are designed to provide for the protection of existing water quality and/or the upgrading or "enhancement" of water quality in all waters within Tennessee. It is recognized that some waters may have existing quality better than established standards.

2. The Criteria and Standards shall not be construed as permitting the degradation of these higher quality waters when such can be prevented by reasonable pollution control measures. In this regard, existing high quality water will be maintained unless and until it is affirmatively demonstrated to the Tennessee Water Quality Control Board that a change is justifiable as a result of necessary social and economic development.

3. All discharges of sewage, industrial waste, or other waste shall receive the best practicable treatment (secondary or the equivalent) or control according to the policy and procedure of the Tennessee Water Quality Control Board. A degree of treatment greater than secondary when necessary to protect the water uses will be required for selected sewage and waste discharges.

4. In implementing the provisions of the above as they relate to interstate streams, the Tennessee Water Quality Control Board will cooperate with the appropriate Federal Agency in order to assist in carrying out responsibilities under the Federal Water Pollution Control Act, as amended.

D. STATE DISCHARGE PERMITS

All three states in the Memphis area have some form of discharge permit requirement. The Tennessee stream pollution control law contains provisions that authorize the Tennessee Stream Pollution Control Board to issue discharge permits. The Board has established general regulations that specify the conditions under which a permit may be issued. All discharges of sewage, industrial wastes or other wastes are required to obtain a permit. The discharge permits stipulate the conditions that must be maintained in the discharged effluents by means of limiting concentrations on specific waste constituents and other restrictions. In effect, the discharge permits set effluent requirements.

The Tennessee regulations also provide that a "Tolerance Permit" may be issued in cases where pollution cannot be immediately abated and the discharge is not immediately dangerous to health. Abatement of pollution must be achieved within a reasonable time period.

Several of the industrial waste sources in the Memphis area have received discharge permits. A number of sources are discharging under these tolerance permits with inadequate or no treatment. A common justification for such permits is that the waste source plans to connect to the Memphis sewerage system when a planned interceptor sewer is completed in the vicinity.

APPENDIX B

CITY OF MEMPHIS ORDINANCE NO. 460

REGULATION OF SEWER USE

CITY OF MEMPHIS ORDINANCE NO. 460
REGULATION OF SEWER USE

Article IV on the use of the Public Sanitary Sewers states in Section 4:

> No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sanitary sewers:
>
> (a) Any gasoline, benzine, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas.
>
> (b) Any waters or wastes containing toxic or poisonous solids, liquids, or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interfere with any sewage or waste water treatment process, or any sanitary sewer system, constitutes a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the sewage or wastewater treatment plant, including but not limited to cyanides in excess of one (1) mg/l as CN in the wastes as discharged to the public sanitary sewer.
>
> (c) Any waters or wastes having a pH lower than 5.5, any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewage works.
>
> (d) Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in the sewers, or other interference with the proper operation of the sewage works such as, but not limited to ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails, paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders.

Section 5 states specifically that the substances prohibited are:

> (a) Any liquid or vapor having a temperature higher than one hundred fifty (150°) F. (65°C).
>
> (b) Any water or waste containing fats, wax, grease, or oils, whether emulsified or not, in excess of one hundred (100) mg/l or containing substances which may solidify or become viscous at temperatures between thirty-two (32°) and one hundred fifty (150°) F. (0° and 65°C).
>
> (c) Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equippped with a motor of three-fourths (3/4) horsepower or greater shall be subject to the review and approval of the Approving Authority.
>
> (d) Any waters or wastes containing strong acid, iron pickling wastes, or concentrated plating solutions whether neutralized or not, except by special permission of the Approving Authority.

Section 5 (con't)

(e) Any waters or wastes containing iron, chromium, copper, zinc, and similar objectionable or toxic substances; or wastes exerting an excessive chlorine requirement, to such degree that any such material received in the composite sewage at the sewage treatment works exceeds the limits established by the Approving Authority for such materials.

(f) Any waters or wastes containing phenols or other taste- or odor-producing substances, in such concentrations exceeding limits which may be established by the Approving Authority, as necessary, after treatment of the composite sewage, to meet the requirements of the State, Federal, or other public agencies of jurisdiction for such discharge to the receiving waters.

(g) Any radioactive wastes or isotopes of long half-life (over 100 days) without special permit. The radioactive isotopes I_{131} and p32 used at hospitals are not prohibited if properly diluted at the source.

(h) Materials which exert or cause:

  (1) Unusual concentrations of inert suspended solids (such as, but not limited to, Fullers earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate).

  (2) Unusual BOD, chemical oxygen demand, or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works.

  (3) Unusual volume of flow or concentration of wastes constituting "slugs" as defined herein.

(i) Waters or wastes containing objectionable substances which are not amenable to treatment or reduction by the sewage treatment processes employed, or are amenable to treatment only to such degree that the sewage treatment plant effluent cannot meet the requirements of the Regulatory Agency.

(j) Any waters or wastes having a pH in excess of 9.5.

APPENDIX C

EPA SURVEY CORRESPONDENCE

Reproduced from
best available copy.

ENVIRONMENTAL PROTECTION AGENCY
WATER QUALITY OFFICE
DIVISION OF FIELD INVESTIGATIONS – DENVER CENTER
BUILDING 22 , ROOM 410 , DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO WHOM IT MAY CONCERN:

This is to introduce Dr. Wayne C. Smith, a Chemical Engineer employed by the Environmental Protection Agency, Division of Field Investigations - Denver Center, Denver, Colorado.

Dr. Smith's visit to your premises is in relation to an industrial waste survey of the Mississippi River drainage area. With your permission, the liquid waste discharge(s) from your premises will be included with those sampled during this survey. The purpose of the survey is to collect information and water quality data which will be used as the basis for: (1) evaluation of Corps of Engineers permits as required under the River and Harbor Act of 1899; (2) determination of present water quality conditions in the Mississippi River, Memphis area, and its tributaries; (3) evaluation of the individual and collective impacts of wastewater discharges on the beneficial water uses of the Mississippi River and its tributaries; (4) determination of water pollution control needs within the area; and (5) abatement proceedings as necessary or warranted under the River and Harbor Act of 1899, the Water Quality Act of 1965, and/or other applicable local, State, and Federal laws.

Your cooperation in the conduct of this survey is essential to the success of the Clean Water effort, and is therefore earnestly solicited.

Sincerely,

Thomas P. Gallagher

Thomas P. Gallagher
Director

ENVIRONMENTAL PROTECTION AGENCY
REGION IV
1421 Peachtree St., N.E., Atlanta, Georgia 30309

C-2

Reproduced from best available copy.

January 31, 1972

Dr. M. B. Burton
Manager
E. I. DuPont Company
P. O. Box 27038
Memphis, Tennessee 38127

Dear Dr. Burton:

This confirms notification, provided to you by Dr. Wayne C. Smith of the Environmental Protection Agency, of a water quality and waste source investigation which is to be conducted in the Memphis area by the Environmental Protection Agency during the period February 7 through March 3, 1972. With your permission, the liquid waste discharge(s) from your premises will be included with those sampled during this survey. The purpose of the survey is to collect information and water quality data which will be used as the basis for: (1) evaluation of Corps of Engineers permits as required under the River and Harbor Act of 1899; (2) determination of present water quality conditions in the Mississippi River and its tributaries; (3) evaluation of the individual and collective impacts of wastewater discharges on the beneficial water uses of the Mississippi River and its tributaries; (4) determination of water pollution control needs within the area; and (5) abatement proceedings as necessary or warranted under the River and Harbor Act of 1899, the Water Quality Act of 1965, and/or other applicable local, State and Federal laws. This means is taken to advise you that information provided by you, as well as data regarding discharges from your Company's premises, may be used as evidence against your Company in abatement proceedings under the applicable laws.

You are requested to provide to this office, not later than February 4, 1972, written permission for Environmental Protection Agency representatives to conduct waste discharge sampling, analysis, and flow measurement, as may be required in the course of the investigation.

Your cooperation in the conduct of this investigation is essential to the success of the Clean Water effort, and is therefore earnestly solicited.

Sincerely,

Harlow

GEORGE L. HARLOW
Chief, Enforcement Branch
Region IV

cc: Dr. Wayne C. Smith
Denver Field Investigation
Center

Identical letter forwarded to all addressees on attached list.

LIST OF ADDRESSEES

(For notification letter - Memphis Survey, 1972)

Dr. M. B. Burton, Manager
E. I. DuPont Co.
P. O. Box 27038
Memphis, TE 38127

Mr. R. E. McClure, Manager
International Harvester Co.
P. O. Box 268
Memphis, TE 28101

Mr. John Rezda, Manager
Kimberly Clark Corp.
P. O. Box 7066
Memphis, TE 38107

Mr. Paul Upton
Delta Refining Co.
P. O. Box 9097
Memphis, TE 38109

Mr. Clarence Colby, Plant Engineer
Firestone Tire and Rubber
P. O. Box 7128
Memphis, TE 38107

Mr. D. C. VanSickle, Manager
Hunt-Wesson Foods, Inc.
P. O. Box 2674
Memphis, TE 38102

Mr. Daniel Marks
Velsicol Chemical Co.
P. O. Box 8127
Memphis, TE

Mr. Geoffrey Hollings, Plant Manager
Whittaker Textile Service Center
615 East Bodley Ave.
Memphis, TE 38106

Mr. Robert M. Stewart, General Manager
W. R. Grace & Co.
P. O. Box 27147
Memphis, TE 38127

Mr. Zawicki, Manager
Atlas Chemical Industries, Inc.
1285 Pope Street
Memphis, TE 38108

Mr. Allen J. Fritsche, Manager of Design
Humko Products
P.O. Box 398
Memphis, TE 38101

Mr. Jim Breazeale
Valley Products
416 East Brooks Road
Memphis, TE 38109

Mr. R. K. Fincher,'Manager
Quaker Oats Company
P. O. Box 8035
Memphis, TE 38108

Mr. R. T. Turner, Manager
Buckeye Cellulose
2899 Jackson Ave.
Memphis, TE 38108

Mr. J. P. Alrutz, Manager, Engineering & Quality
Chapman Chemical
P. O. Box 9158
Memphis, TE 38109

Mr. Jim Baird
Piper Brothers
695 West Poplar
Collierville, TE 38017

List of Addressees for Memphis Survey (Continued)

Day and Night Company
Payne Company
97 South Byhalia
Collierville, TE 38017

Mr. Pat Reilly, Assistant Plant Manager
Schlitz Brewery - P. O. Box 18309
Holiday City Station
Memphis, TE 38118

Mr. E. O. Miller
Naval Air Station Memphis (84)
Millington, TE 38054

Mr. John Clement
City of Millington
4836 Navy Road
Millington, TE 38054

IC-8511 REV. 5-64

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
P. O. BOX 27038
MEMPHIS, TENNESSEE 38127

ELECTROCHEMICALS DEPARTMENT

C-5

February 3, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Region IV
Environmental Protection Agency
1421 Peachtree St., N.E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

Re: Water Quality and Waste Source Investigation

In reply to your letter of January 31, 1972, this is to advise that the Memphis Plant, E. I. du Pont de Nemours & Company grants permission for Environmental Protection Agency representatives to conduct waste discharge sampling, analysis and flow measurement of waste water discharged to the Loosahatchie River at this location during the period February 7 through March 3, 1972.

The nature of our operation requires that visitors on our site unfamiliar with our processes and products be escorted for their own safety and well being. Consistent with this policy, we grant this permission with the understanding that your employees conducting the requested program will be escorted while on our site.

We understand that waste water samples are to be split. We will, of course, want to discuss with your representatives the analytical methods to be used in order to ensure uniformity.

We are looking forward to their visit with the expectation of a successful sampling campaign.

Very truly yours,

M B Burton
M. B. Burton
Plant Manager

MBB:cm

INTERNATIONAL HARVESTER COMPANY
FARM EQUIPMENT DIVISION
MEMPHIS WORKS
3003 HARVESTER STREET • MEMPHIS, TENNESSEE 38101

TELEPHONE—AREA CODE 901
357-5311

ADDRESS REPLY TO
P. O. BOX 268
MEMPHIS, TENNESSEE 38101

February 2, 1972

Environmental Protection Agency,
Region IV
1421 Peachtree Streett, N.E.
Atlanta, Georgia 30309

Attention: Mr. George L. Harlow,
Chief

Dear Mr. Harlow:

I received your letter this morning informing me that your group will be making a water quality and waste source investigation in the Memphis area during the period of February 7 through March 3, 1972, and Memphis Works International Harvester Company is included in the survey.

I have not heard from Doctor Wayne C. Smith since he made a visit with us several months ago; but, we did tell him at that time we would cooperate with his study.

Please advise me when this survey is to be conducted at this Works and I will make available to you an Engineer to assist in any way you deem necessary.

R. E. McLure
Plant Engineer

REMcL/aab

cc: J. W. Wegener

C-7

KIMBERLY-CLARK CORPORATION

February 3, 1972

Mr. George L. Harlow
Chief Enforcement Branch
Environmental Protection Agency, Region 4
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

This is to acknowledge receipt of your letter dated January 31, and will constitute the written permission requested for the Environmental Protection Agency representatives to conduct waste discharge sampling and flow measurement on our premises during the period February 7 through March 3, 1972, and analysis as required.

In view of the concern expressed during Dr. Smith's visit regarding the suitability of our normal sampling location for this purpose, we would call to your attention another point which may be more suitable in that it will allow a sample to be taken just prior to the outfall discharge into the Wolf River. We assume that adequate advance notice will be given so that we may have personnel available, take the necessary safety precautions, and efficiently accomplish the required sampling and flow measuring.

During Dr. Smith's visit, it was also indicated that there would be no objection to splitting the samples so that we may run an independent analysis. We will plan on doing this.

It is our intention to cooperate with E. P. A. in the conduct of this investigation in any reasonable way to assure the success of the clean water effort.

Sincerely yours,

John Rezba

John Rezba
Memphis Mill Manager

KIMBERLY CLARK CORPORATION P. O. BOX 7066 MEMPHIS, TENNESSEE [illegible] PHONE [illegible]

DELTA REFINING COMPANY p. o. box 9097 • memphis tennessee 38103

February 3, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Environmental Protection Agency
Region IV
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

By your letter of January 31, you have requested permission for your agency representatives to survey and take samples of our plant water effluents. We extend a welcome to members of your team to conduct this survey of our operations during your Memphis inspections February 7 through March 3, 1972.

Perhaps when your representative arrives he can clarify for us how the cooperation you solicit, and which you shall receive from us, can best be afforded when at the same time you advise us that the data that you obtain from your inspection here "may be used as evidence against" -- us. Of our cooperation you can be assured. Our corporate objectives for improving our environment are absolutely parallel to those of which your mission is directed.

Sincerely,

RTP:gh

R. T. PRATER, *president*

The Firestone Tire & Rubber Company

HARVEY S. FIRESTONE · FOUNDER

ENERAL OFFICES
AKRON, OHIO 44317

MEMPHIS PLANT
P. O. BOX 7128

MEMPHIS, TENNESSEE
38107

C-9

February 1, 1972

Mr. George L. Harlow
Chief, Enforcement Branch, Region IV
Environmental Protection Agency
1421 Peachtree St., N. E.
Atlanta, Georgia 30309

Reproduced from best available copy.

Dear Mr. Harlow:

Your letter of January 31, 1972 requested that we provide, not later than February 4, 1972, written permission for Environmental Protection Agency representatives to include the liquid waste discharge(s) from our premises with those sampled during the Memphis area survey to be made February 7 through March 3, 1972. We are aware of the fact that information and/or data regarding discharges from our company's premises may be used against us in abatement proceedings under applicable laws. Due to the corrective actions to date and our desire to cooperate with environmental improvement, we would intend to comply with applicable laws and make our contribution to the clean water effort.

Access to our surface water discharge is outside the plant fence. If it is desired to inspect our new industrial waste sewer facility which discharges into the city sewerage system, entry to the fenced area will be via the gate on Corrine Avenue. Before any activity is undertaken, contact should be made with the writer or with Mr. E. H. Stanfield so clearance and orientation can be arranged.

Please consider this as written permission and/or invitation for Environmental Protection Agency representatives to conduct waste discharge sampling, analysis and flow measurement as may be required in the course of the Memphis area investigation.

Very truly yours,

Clarence Colby

Clarence Colby
Plant Engineer

CC/eb

one ▷ Your Symbol of Quality and Service

C-10

HUNT-WESSON FOODS

Post Office Box 2674
Memphis, Tennessee 38102
901 274-6410

February 3, 1972

Mr. George L. Harlow, Chief
Enforcement Branch
Environmental Protection Agency
Regional IV
1421 Peachtree St. N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

This is to be taken as permission for the Environmental Protection Agency Representative to conduct waste discharge sample analysis and flow measurements at the Memphis Refinery of Hunt-Wesson Foods, Inc. We would like advance notification as to when your representative is scheduled to visit our operation.

We would like to take this opportunity to advise you that we are not to be held liable in any respect for personnel representing the Environmental Protection Agency in the confines of our plant. We understand that they are solely under the responsibility of the Environmental Protection Agency.

You can be assured that we will cooperate with any representative of the EPA during their condution of activities at our operation. If we can be of any further assistance in the meantime, please advise.

Sincerely,

Hunt-Wesson Foods, Inc.

B D Gunter
B. D. Gunter
Plant Manager

BDG/pe

VELSICOL CHEMICAL CORPORATION

99 Warford Street • Memphis, Tennessee 38108 • Area Code 901 • 324-4401

February 1, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Environmental Protection Agency
Region IV
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

This letter is to advise you of our permission to conduct sampling, analysis, and flow measurement of the liquid waste discharges from our premises as requested in your letter of January 31, 1972. We understand the period of the survey is to be from February 7 through March 3, 1972.

Very truly yours

VELSICOL CHEMICAL CORPORATION

Daniel R. Marks

Daniel R. Marks
Technical Superintendent

DRM/lmn

cc: W. J. Anthony
Neil Mitchell
M. Lissner
R. Owen

Whittaker
CORPORATION

C-12

MAILING ADDRESS:
POST OFFICE BOX 416
MEMPHIS, TENNESSEE 38101

TEXTILE SERVICE CENTER
615 EAST BODLEY
MEMPHIS, TENNESSEE 38106
TELEPHONE: (901) 948-7711

February 2, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Region IV
Environmental Protection Agency
1421 Peachtree St., N.E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

With reference to your letter of January 31, 1972, in which you requested permission to evaluate our effluent, we are presently constructing new sewers which will collect our plant effluent and ultimately tie into the City sewer system. Also, we are currently conducting studies of our effluent for the Corps of Engineers, State of Tennessee and City of Memphis.

In view of these undertakings, we respectively request that you delay your study for 30 days. In the event our construction and studies are not complete at that time, we will be in touch with you just as soon as we know something definite.

Very truly yours,

Robert Leedy
New Products Development Manager

RL/tcv

CC: Stephen Biller
G. I. Hollings

C-13

W. R. GRACE & CO.
AGRICULTURAL CHEMICALS GROUP
P. O. BOX 27147 • MEMPHIS, TENN. 38127 • PHONE: 357-2311

February 3, 1972

Mr. George L. Harlow, Chief
Enforcement Branch, Region IV
Environmental Protection Agency
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

Dr. Wayne C. Smith and Mr. J. C. Alleman of the Environmental Protection Agency and representatives of the Memphis and Shelby County Health Department visited with us last October 4 to discuss the Agency's plan to conduct a water quality and waste source investigation in the Memphis area. As a result of this meeting and later telephone conversations which I had with Dr. Smith, we understood that Dr. Smith would forward to us details of his program as it applied to our plant. We understand these details will provide for W. R. Grace & Co. receiving a portion of all samples taken at our plant. We also understand his program will not require entrance to the manufacturing area of our operation where confidential operating information could be involved. On the basis of the above understandings, I verbally agreed with Dr. Smith on October 7, 1971, that we would cooperate with the Environmental Protection Agency in this survey. This letter will confirm this agreement with Dr. Smith.

Please have Dr. Smith contact F. L. Applegate, Production Manager, or E. M. Smith, Manager, Urea and Utilities Department, to arrange for entry to our waste treating facilities.

Very truly yours,

W. R. GRACE & CO.
Agricultural Chemicals Group

R. M. Stewart

R. M. Stewart, General Manager
Memphis, Big Spring, and Aruba

RMS:sm

ICI America Inc.

Wilmington, Delaware 19899
(302) 658-9311

February 3, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Region IV
Environmental Protection Agency
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Reproduced from best available copy.

Dear Mr. Harlow:

This is to reply to your letter of January 31, 1972, addressed to Mr. Zawicki, Manager, "Atlas Chemical Industries, Inc.". Please be informed that the name of this Company was changed effective January 1, 1972, to that which appears on this letterhead.

We are pleased to grant permission to representatives of the Environmental Protection Agency to conduct waste discharge sampling, analysis and flow measurement as may be required at the Memphis Plant. You are requested to provide us with specific dates when your representatives desire to visit. We have limited plant personnel available to conduct and assist your representatives in their investigation and we trust that you will cooperate in arranging a schedule of visitation to suit our mutual convenience.

If you have any questions or wish to discuss this matter further, please contact us. We shall, in any event, anticipate your reply with respect to arranging an appropriate visitation schedule.

Very truly yours,

CENTRAL ENGINEERING DEPARTMENT

S. A. LaRocca

S. A. LaROCCA, SUPERVISOR
SANITARY ENGINEERING

AL:ag

C-15

HUMKO PRODUCTS
White Station Tower, P. O. Box 398
Memphis, Tennessee 38101

Division of
Kraftco Corporation

February 1, 1972

Mr. George L. Harlow
Chief, Enforcement Branch, Region IV
Environmental Protection Agency
1421 Peachtree St. N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

This is to acknowledge receipt of your letter of January 31, 1972, to our Mr. Allen J. Fritsche.

Your request for written permission to conduct waste discharge sampling, analysis, and flow measurements as required for your investigation has been forwarded to our appropriate corporate official. I will promptly reply to your request after receiving the necessary authorization.

Yours very truly,

Curt Meierhoefer
Vice President - Engineering

CM/cg

C-16

HUMKO PRODUCTS
White Station Tower, P.O. Box 398,
Memphis, Tennessee 38101

Division of
Kraftco Corporation

February 3, 1972

Environmental Protection Agency
Region IV
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Attention: Mr. George L. Harlow, Chief
Enforcement Branch, Region IV

Gentlemen:

Pursuant to your letter of January 31, 1972, HumKo Products authorizes the Environment Protection Agency to conduct such waste disposal sampling, analysis and flow measurement as may be required in connection with the water quality survey to be conducted in the Memphis area from February 7, 1972, through March 3, 1972.

It is our understanding that all data in regard to such sampling, analysis and flow measurement will be held confidential by the EPA unless used as evidence against HumKo in abatement proceedings under applicable laws.

Sincerely,

Curt Meierhoefer
Vice President - Engineering

CM/cg

C-17

Valley Products Co. *Manufacturers of*
- SOAPS
- CLEANERS
- DETERGENTS

384 BROOKS AVENUE P. O. BOX 16545 • PHONE 396-0646 • MEMPHIS, TENNESSEE 38116

February 4, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Region IV
Environmental Protection Agency
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

We will be pleased to cooperate as fully as possible with Dr. Smith in connection with the Environmental Protection Agency's water quality and waste source investigation in the Memphis area during the period February 7th to March 3rd, 1972.

As I discussed with Dr. Smith during his visit, all gates are locked after business hours and we will need to schedule his visits here with this in mind. Any sampling or flow apparatus may of course be left within the locked premises overnight.

Please note our correct address above and change your records accordingly. We will look forward to hearing from Dr. Smith in the near future.

Very truly yours,

VALLEY PRODUCTS CO.

J. A. Breazeale, President

JAB/lb

The Quaker Oats Company

P. O. BOX 8035
HOLLYWOOD STATION
MEMPHIS, TENN. 38108

C-18

February 4, 1972

Mr. George L. Harlow, Chief
Enforcement Branch, Region IV
Environmental Protection Agency
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

The Quaker Oats Company will be pleased to cooperate with your agency in conducting a water quality and waste source investigation. Your representatives have our permission to sample, analyze and make flow measurements at our Memphis Chemical Plant.

I am sure you understand that access to some areas of the plant is restricted because of proprietary process information that might be divulged to a visitor. I am sure that you can complete your survey without visiting these areas, and that this will in no way deny you information on any waste discharge.

We will be happy to instruct your representatives concerning plant safety regulations and will assist them in any way we can.

Yours very truly,

THE QUAKER OATS COMPANY

R. K. Fincher
MANAGER

RKF:ph

C-19

The Buckeye Cellulose Corporation

First in cellulose

2899 JACKSON AVENUE • MEMPHIS, TENNESSEE 38108 • AREA CODE 901 324-8861

P. O. Box 8407

February 2, 1972

Mr. George L. Harlow
Environmental Protection Agency
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

We have received your letter of January 31 requesting that we provide you with written permission to conduct waste discharge sampling analyses and flow measurements in the course of an investigation which representatives of the Agency will be conducting in the Memphis area during the period of February 7 through March 3, 1972. In the spirit of cooperation with the purposes which your agency is seeking to accomplish, we are pleased to provide you with this permission.

We believe it is worth pointing out that, over a considerable period of time, we have been working closely with the appropriate authorities in the State of Tennessee and the City of Memphis in connection with matters relevant to your survey. Because of this fact and also because of the statutory obligations imposed upon the Agency under the Federal Water Pollution Control Act as amended, we respectfully request that your investigation be conducted jointly with these state and local agencies. We are taking the liberty of sending a copy of this letter to each of them so that they will be aware of our position in this matter.

Very truly yours,

T. R. Turner

T. R. Turner
Plant Manager

afw

cc: Mr. S. Leary Jones, Executive Secretary
State of Tennessee Stream Pollution Control Board

Mr. John L. Phillips, Director of the Division of Pollution Control
Memphis-Shelby County Health Department

SMC

SMALLEY MAGNESIUM COMPANY, INC.
DIVISION OF PIPER INDUSTRIES, INC.
719 PIPER STREET, COLLIERVILLE, TENNESSEE 38017 901/853-4761

C-20

February 3, 1972

Reproduced from best available copy.

Mr. George L. Harlow
Environmental Protection Agency
1421 Peachtree St., N.E.
Atlanta, Georgia 30309

Reference: Your letter to Piper Brothers of 1-31-72

Dear Sir:

This letter is to authorize the Environmental Protection Agency Representatives to conduct waste discharge sampling, analysis, and flow measurement, as may be required.

To reemphasize the conversation with Dr. Smith of E.P.A., our waste discharge is of an intermittant nature. We will be shut down during the period from February 16th to February 21st to have the sludge pumped from our lagoon. Sampling can be taken any time during the period of February 23rd to March 3rd. If these dates so not meet your schedule, please advise as once so that we may reschedule.

Thank you for your cooperation in this matter. Please advise if any further information is needed.

Very truly yours,
SMALLEY MAGNESIUM CO.

James W. Baird
James W. Baird
Mfg. Engineer

JB/jd

C-21

DAY & NIGHT COMPANY
PAYNE COMPANY
COLLIERVILLE, TENNESSEE 38017

February 3, 1972

ENVIRONMENTAL PROTECTION AGENCY
Region IV
1421 Peachtree Street, N.E.
Atlanta, Georgia

ATTN: MR. GEORGE L. HARLOW
CHIEF, ENFORCEMENT BRANCH

Dear Mr. Harlow:

This is in response to your letter dated January 31, 1972 and acknowledgement of the request for permission and cooperation in conducting waste discharge sampling, anaylsis, and flow measurement.

Regular plant hours are Monday through Friday - 8:00 a.m. to 4:30 p.m. and I, or a Management representative, will be available to assist your representatives upon their arrival.

Sincerely,

Reynold Kordatzky
Manager of Safety & Security

/ghl

JOS. SCHLITZ BREWING COMPANY
MILWAUKEE, WISCONSIN 53201

MP S PLANT
P. O. BOX 18309
HOLIDAY CITY STATION
M PHIS, TENNESSEE 38118
T EPHONE: 901-362-5450

C-22

February 2, 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Environmental Protection Agency
1421 Peachtree St., N. E.
Atlanta, Ga. 30309

Dear Mr. Harlow:

We are in receipt of your correspondence dated January 31, 1972 regarding the forthcoming survey to be conducted by the Environmental Protection Agency.

By copy of this letter, the Jos. Schlitz Brewing Company grants "... permission for Environmental Protection Agency representatives to conduct waste discharge sampling, analyses and flow measurement" associated with the operation of the brewery in Memphis, Tennessee.

As I am sure you are aware, Dr. Wayne Smith has scheduled the survey team to proceed with the investigation and collection of data during the week of February 21, 1972. We, most assuredly, will cooperate in every way possible with the survey team while at the Jos. Schlitz Brewing Co.

Sincerely,

Patrick A. Reilly

Patrick A. Reilly

PAR:bw

NAVAL AIR STATION MEMPHIS (84)
MILLINGTON, TENNESSEE 38054

C-23

Code PWU
4 February 1972

Mr. George L. Harlow
Chief, Enforcement Branch
Environmental Protection Agency
Region IV
1421 Peachtree St. N.E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

This is to notify you that the Environmental Protection Agency representatives have permission to conduct waste discharge sampling and analysis as necessary at this activity as requested in your letter of 31 January 1972.

R. J. HOUGHTON
CDR, CEC, USN
PUBLIC WORKS OFFICER
By direction of the Commanding Officer

Copy to:
Mr. Jim Carr
South Div NAVFAC
Charleston SC

THOMAS F. HALL, MAYOR

MRS. LOIS UFFELMAN, CLERK

City of Millington

Millington, Tennessee

Board of Aldermen

C RLES W. BAKER
C . HARVELL, JR.
C D HOLLINGSWORTH
W. S. HOWARD
C. W. MALEY
V . McKELVY
D . WAGES

C-24

February 2, 1972

Mr. George L. Harlow. Chief,
Enforcement Branch Region IV,
Environmental Protection Agency,
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Harlow:

As requested by your letter of January 31, 1972, the Environmental Protection Agency is hereby granted permission to take any samples, make any tests or other procedures to evaluate the discharge wastes from our wastewater and water treatment facilities.

We are prepared to cooperate with your representatives in every possible way. Clean water is our responsibility also.

It is requested that we be supplied with a copy of data taken from our facilities.

Very truly yours,

John Clement

John Clement,
Water Superintendent,
City of Millington.

JC:maf